सत्यमेव जयते

Report of the Comptroller and Auditor General of India for the year ended March 2018

लोकहितार्थ सत्यनिष्ठा

Dedicated to Truth in Public Interest

Union Government (Defence Services)
Ordnance Factories
Report No. 15 of 2019

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Comptroller and Auditor General of India

for the year ended March 2018

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CONTENTS

Paragraph	Subject	Page No.
	Preface	iii
	Executive Summary	v-xiv
	CHAPTER I	
1	Performance of Ordnance Factory Board	1-19
	CHAPTER II	
2	Production of Fuzes in Ordnance Factories	20-56
2.1	Introduction	20
2.2	Production Planning and Capacity	28
2.3	Procurement of input material/components/Fuzes	36
2.4	Quality Conformance during and after Production	41
2.5	Research and Development Projects for Fuzes	50
2.6	Conclusion and Recommendations	54
	CHAPTER III	
3.1	Functioning of e-procurement system in Ordnance Factories	57
3.2	Operation of Bank Accounts in Ordnance Factories	66
3.3	Avoidable extra expenditure of ₹3.27 crore on procurement of Horizontal Machining Centre at Ordnance Factory Kanpur	81
3.4	Extra expenditure by High Explosive Factory Kirkee due to placement of an order on unqualified firm for supply of a chemical plant	83
3.5	Loss of ₹62.10 crore on replacement of defective ammunition to Army by Ordnance Factory Badmal	85
3.6	Injudicious procurement of shell filling machine at a cost of ₹21.46 crore at Ordnance Factory Chanda	88
	ANNEXURES	
Annexure-I		93
Annexure-II		94
Annexure-III		96
Annexure-IV		97
	APPENDIX	
Appendix-I (List of Abbreviations)		98
Appendix-II (Glossary of Terms)		101

PREFACE

This Report for the year ended 31 March 2018 has been prepared for submission to the President of India under Article 151 of the Constitution of India.

This Report of the Comptroller and Auditor General of India contains the results of audit of the transactions pertaining to Ordnance Factories in 2017-18.

The instances mentioned in this Report are those, which came to notice in the course of test audit for the period 2017-18 as well as those which came to notice in the earlier years, but could not be reported in the previous Audit Reports; matters relating to the period subsequent to 2017-18 have also been included, wherever necessary.

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

Executive Summary

This Report contains the results of audit of financial transactions for the year ended March 2018 pertaining to Ordnance Factories Organisation, under the Department of Defence Production of the Ministry of Defence. The Report is divided into three chapters. Chapter-I contains the analysis of the performance of Ordnance Factory Board for the year 2017-18. Chapter-II contains Performance Audit on "Production of Fuzes in Ordnance Factories". Chapter-III contains two thematic audits on "Functioning of e-procurement system" and "Operation of Bank Accounts" as well as four audit paragraphs on other issues.

The significant audit findings of the Report are summarised below:

Performance of Ordnance Factory Board

Ordnance Factory Board (OFB) functions under the administrative control of the Department of Defence Production, Ministry of Defence. OFB is engaged in production of a range of arms, ammunition, equipment, clothing,*etc.* primarily for the Armed Forces of the country. There are 41 Ordnance Factories divided under five operating groups under the OFB.

The OFB received budgetary grant of ₹14,793 crore and ₹804 crore in 2017-18 to meet its revenue expenditure and capital expenditure respectively. Against these grants, it spent ₹14,563 crore and ₹797 crore respectively under revenue and capital accounts.

During 2017-18, the Cost of Production (COP) at these factories was ₹20,127 crore which included inter-factory issues of ₹6,059 crore. COP showed a marginal increase over the last year. Stores, Labour and Direct expenses accounted for 54 *per cent*, 12 *per cent* and 1 *per cent* of the Cost of Production respectively. Overheads (Indirect Costs) contributed 33 *per cent* of the Cost of Production. Major elements of Overheads are supervision charges and indirect labour costs which together contributed 56 *per cent* of total overhead costs in 2017-18.

In 2017-18, OFB supplied materials of ₹14,251 crore (1 *per cent* decrease from the previous year) to its different indentors. Indian Army is the major indentor for products of the Ordnance Factories, accounting for nearly 80 *per cent* of the total

issues. Issues to Defence indentors are required to be on cost basis. However, OFB earned a surplus of ₹628 crore against issues to the Armed Forces. Further, exports by OFB decreased by 39 *per cent* from ₹22.69 crore in 2016-17 to ₹13.94 crore in 2017-18. The major exports of the Ordnance Factories included Prahari Gun, Brake Parachute and Kavach Launcher.

Army places demand on OFB for supply of the items and subsequently, OFB fixes production targets to the Factories to fulfill the demand of Army. A significant quantity of Army's demand for some principal ammunition items remained outstanding as of 31 March 2018, thus adversely affecting their operational preparedness. The Factories achieved the production targets for only 49 *per cent* of items in 2017-18.

OFB held an inventory of ₹14,748 crore representing 73 *per cent* of the Cost of Production in 2017-18. More than half of the inventory (52 *per cent*) was the stores-in-hand *i.e.* stores procured for manufacturing but not used within the year by the factories. Stores-in-hand has shown an increasing trend in the last five years 2013-18. Stores-in-hand as on 31 March 2018 were ₹7,566 crore which included non-active stores of ₹1,055 crore *i.e.* Non Moving stores, Slow Moving stores and surplus/scrap/waste/obsolete stores. Action at appropriate level is required to be initiated for prompt disposal of inactive and surplus stores.

Further, WIP (Work-in-Progress: unfinished items lying at the shop floor) constituted almost 32 *per cent* of the total inventory. This is an area of concern. Production order to manufacture an item is to be closed within six months. The main reason for high holding of WIP is that a large number of production order, the oldest being from the year 2009-2010, remained outstanding as of March 2018 of which 17 *per cent* pertained to more than one year old period.

Regularisation of loss is subject to investigation of the case by a Board of Enquiry to fix responsibility, which is expected to submit its report within two months. During 2017-18, a significant number of cases of loss (255 cases of losses amounting to ₹117 crore) remained pending for regularisation by the Ministry for years together and the oldest item pertained to November 1981.

To improve operational efficiency, Ministry identified non-core activities that can be either closed down or put on the Public Private Partnership (PPP) model for optimal use of OFB's vast infrastructure and skilled manpower. Ministry identified (April 2017) 143 items as non-core items under production with OFB and decided that

Army can procure these non-core items from trade without getting no objection certificate (NOC) from OFB. These non-core items include clothing items (mosquito net, leather gloves, trouser, socks), Jelly Filled Cables, binoculars, ammunition box, *etc.* On the other hand, OFB can participate in such tenders of Army and get orders on competitive basis.

Regarding action plan on the non-core activities, OFB has decided that (i) Factories will manufacture all core items in-house; (ii) manpower engaged in the declared non-core items will be re-engaged in the production of core items; and (iii) in absence of the demands, production line will be changed to manufacture other core items to utilise its capacity.

Annual accounts of the OFB are being maintained in two formats *viz.* traditional and commercial format through Proforma Accounts. The introduction of commercial accounting system through Proforma Accounts is a step towards facilitating commercially competitive decisions in an evolving environment in defence production with the entry of private sector.

There are certain accounting issues which require to be resolved by the OFB to exhibit true and fair view of the state of affairs of OF organization as well as to bring about more financial control and discipline, as indicated below:

- Slow-moving, non-moving and obsolete inventory items need to be identified specifically every year with age-wise analysis.
- In some cases, bills were received from suppliers in the Month of April or May of the next financial year but liabilities of the expenditure incurred for the current financial year were not recognised. A cut-off date needs to be fixed for accepting bills so that liability to the extent possible could be recognised in the Accounts.
- It is necessary to obtain confirmation from the party appearing under Sundry Debtors in view of substantial increase in Sundry Debtors over last three years.
- There were discrepancies between balance as per Accounts and Cash Book.

(Chapter I)

Production of Fuzes in Ordnance Factories

Ordnance Factories (OFs) manufacture and issue various types of ammunitions to Armed Forces. Fuze is an essential and critical part of ammunition to provide safe and reliable detonation of ammunition at the desired time and place.

Audit covered the performance of nine OFs (four empty fuze manufacturing factories and five filling factories), OFB and Quality Assurance Establishments attached with these OFs in respect of 15 selected fuze items for the period from 2013-14 to 2017-18.

The Audit findings have been broadly divided into (a) lack of capacity of production of empty and filled fuzes, (b) shortfalls of production against targets, (c) constraints in procurement of input materials, (d) quality problems during the production and fuzes issued to the Users and (e) Research and Development (R&D) efforts.

The same are summarised as under:

- **Deficiency in capacity-building *vis-à-vis* Users' requirement**

In Ordnance Factories (OFs), the production capacity for empty and filled fuzes were not adequate to meet Army's requirement of ammunition. There were mismatches in availability of empty fuze from in-house production as well as from trade sources and their filling capacity in OFs.

Capacity augmentation was required for production of seven types of empty fuze and also for filling of seven types of fuzes out of the sample of 15 fuzes. Till March 2019, OFs augmented the production capacity of only one empty fuze (B-429E) as required and of empty fuze B-429 partially. Further, filling capacity of only one fuze (DA 5A) was increased as required and that of two other fuzes (117 MK-20 and B-429) was enhanced partially.

- **Shortfall of production against targets**

OFB fixed production targets of fuzes for OFs each year based on the indents (orders) of the Users and production capacity of the OFs. However, the production targets were revised several times mid-year either at the instance of Users due to changes in their priority and budgetary allocation or by the factories themselves owing to their production constraints.

In 19 out of 49 cases of upward revision of targets, the factories failed to achieve even the original targets. In respect of 32 cases of downward revision, the factories could not meet even the final target in 22 cases. Major shortfalls in production were noticed for eight types of empty fuzes mainly due to material constraints and quality problems.

This resulted in slippages in issue of related ammunitions/ spare filled fuzes to the Users leading to critical deficiency of seven types of ammunition (ranging from 32 to 74 *per cent*) and five types of spare fuzes (41 to 94 *per cent*) at the Users' stock as of March 2018. Moreover, due to non-availability of spare fuzes, Army had stock of 'P' lakh ammunitions worth ₹403.27 crore lying in unusable condition.

- **Procurement of input material/components/Fuzes**

Open Tender Enquiry (OTE) is resorted to for procuring input materials. Source Development OTE (SD OTE) is issued for developing new sources, wherein the already established sources for a particular item are not eligible to participate. In case of urgency, Limited Tender Enquiry (LTE) can be resorted to.

Ordnance Factories (OFs) had not taken adequate efforts for developing vendor base through source development (SD)/normal open tender enquiry (OTE). Empty fuze manufacturing factories issued only 8 *per cent* SD OTEs and 4 *per cent* normal OTEs. For filling factories, the extent of SD OTEs and normal OTEs was 13 and 8 *per cent* respectively. However, the empty fuze factories and filling factories resorted to LTEs to the maximum extent of 77 and 75 *per cent* respectively because of availability of limited number of vendors.

There were inordinate delays in issue of tender enquiry (TE) and placement of orders for procurement of input materials. Delays were noticed in 83 *per cent* of the TEs (1 to 24 months) and 56 *per cent* of the orders (5 to 26 months) examined in empty fuze manufacturing factories. The extent of delayed TEs and orders were 77 and 47 *per cent* respectively in the filling factories.

There were also substantial delays (89 to 2774 days) in receipt of input materials in 115 supply orders out of 294 orders examined in two empty fuze manufacturing factories and four filling factories. This was further compounded by delays in inspection of the materials and taking them in stock. Delays occurred in 79 *per cent* and 73 *per cent* instances in empty manufacturing factories and filling factories respectively.

Besides, four filling factories had to procure four types of empty fuzes ('Q' lakh) and three types of filled fuzes ('R' lakh) worth ₹335 crore from trade sources due to

capacity constraints and short supply of empty fuzes by the feeder factories compounded by significant rejection of filled fuzes in quality inspection.

- **Quality Conformance during and after Production**

Inadequate quality checks both by the factories and Quality Assurance agencies in manufacturing led to significant quantum of return and rejection of five/six types of empty fuzes. Substantial rejections were noticed in case of four types of filled fuzes also. Further, delays (up to 760 days) in proof trials of empty/filled fuze contributed delay/shortfall in issue of ammunitions to the Users.

There were substantial delays in investigating the causes of rejection by Joint Investigation Team/Failure Review Board. In many cases, result of the investigation remained inconclusive. In some cases, the remedial measures suggested by the investigating team/board were not implemented timely, which resulted in rejection of subsequent lots on the same grounds.

Audit noticed that 18 accidents had occurred at the Users' end relating to six ammunitions mainly because of fuze related defects/problems. Abnormal delays (174 to 664 days) in completing the defect investigations of these accidents led to consequential delay in taking remedial actions by the concerned factories involved in manufacture of the fuzes.

- **Research and development projects for fuzes**

OFB could not fulfil the Army's requirement of electronic fuzes due to lack of infrastructure and capability. Hence, Army had to order 'S' lakh electronic fuzes (valuing ₹1,511 crore) during 2013-14 to 2017-18 on M/s Electronic Corporation of India Limited (ECIL) and M/s Bharat Electronics Limited (BEL).

Six R&D projects remained incomplete even after lapse of one to six years from their planned date of completion and four projects relating to up-gradation and development of components/manufacturing process of four existing fuze items were also belatedly completed. This indicates lack of due monitoring in implementing the projects. Similar was the fate of three projects for development of new fuze items (three types). It ultimately defeated the basic objectives of R&D efforts for in-house production of the intended fuze components.

(Chapter II)

Functioning of e-procurement system in Ordnance Factories

Ordnance Factory Board (OFB) introduced (September 2011) e-procurement system in Ordnance Factories in order to increase efficiency and transparency in procurement of stores, plants and machineries and execution of civil works. The Information Technology (IT) System was developed by M/s m-junction Services Ltd, Kolkata at a cost of ₹18.99 crore.

Rules and procedures stipulated in Procurement Manual of Ordnance Factory Board were not followed completely in its e-procurement system. In many cases, there were frequent and arbitrary extensions of last date of bid submission.

Transparent bidding could not be ensured as instances of submission of multiple bids from a single machine and use of same Digital Signature Certificate by multiple users in various tenders, were noticed. This indicated the possibility of cartelisation amongst bidders or participation of dummy users in a tender.

The e-procurement system lacked appropriate checks for capturing duplicate e-mail ID/alternate e-mail ID/phone number, invalid PAN and phone number *etc*.

Further, the same firm (M/s m-junction Services) being developer as well as maintenance agency of the e-procurement portal, database of the defence organisation may be at risk of misuse by a private entity.

(Paragraph 3.1)

Operation of Bank Accounts in Ordnance Factories

Controller General of Accounts (CGA), Ministry of Finance, had launched (August 2012) a full-fledged electronic delivery of payments services through government e-Payment Gateway in order to eliminate disbursement of payments in cash and to ensure quick disbursement directly to the bank accounts of payees. CGA also issued (March 2016) guidelines for payment of Government money into the accredited Bank branch of the Ministry /Department through Debit /Credit Cards and Net Banking facility.

In compliance with these instructions, Controller General Defence Accounts (CGDA) had given (August 2016) direction to OFB for depositing Government receipts into the Government Account through e-MRO. This was aimed to eliminate the system of

receiving Government money in Bank Accounts (Public Fund Accounts) and remitting the same to Government Account through Challan, called Military Receivable Order (MRO).

Ordnance Factories, however, partially continued their payments and receipts of Government money through manual method also. Non-utilisation of electronic modes for payments and receipts fully, caused considerable delay in making payments to the employees and in depositing government receipts into Government Accounts during the period from 2015-16 to 2017-18. Government money (₹154.41 crore) remained parked in 60 Bank Accounts *i.e.* outside Government Account as on 31 March 2018.

Factories also did not take appropriate steps to reconcile properly Cash book balances and Bank pass book balances in respect of these Bank Accounts. This could have mitigated accumulation of fund in the Bank Accounts. Further, parking of funds in the Bank account is fraught with immense risks as was seen in the defalcation of ₹6.56 crore in Rifle Factory, Ishapore by the Factory officials themselves.

There is no necessity for operation of Bank Accounts (Public Fund Accounts), after operationalisation of e-Payment Gateway and e-MRO for disbursement of payments to the payees and in collating and depositing Government receipts into Government Account respectively. OFs, instead of closing existing Bank Accounts, had opened 22 additional Bank Accounts over and above one PF Account for each factory.

(Paragraph 3.2)

Avoidable extra expenditure of ₹3.27 crore on procurement of Horizontal Machining Centre at Ordnance Factory, Kanpur

Ordnance Factory, Kanpur issued (October 2012) a tender enquiry for procurement of two machines through e-procurement system. In response, bids of two firms were received. Ordnance Factory, Kanpur did not consider the bid of one firm on the ground of ambiguity in the quoted rates. Factory neither sought clarification from the firm nor agreed to the advice of its Accounts Office for referring the case to OF Board. Instead, it decided to retender the case.

In retendering (January 2014), the Factory procured the two machines from the same firm by incurring an extra expenditure of ₹3.27 crore which was clearly avoidable. The firm had also increased its quote from ₹5.04 crore to ₹6.67 crore per machine within a span of 13 months.

(Paragraph 3.3)

Extra expenditure by High Explosive Factory, Kirkee due to placement of an order on unqualified firm for supply of a chemical plant

High Explosive Factory (HEF), Kirkee did not exercise due diligence before concluding a contract (April 2012) for procurement of Ammonium Perchlorate (AP) Plant.

The selected firm was not technically and financially qualified for this project. The contract was terminated (November 2013) as the firm failed to execute the project. HEF concluded (June 2015) a contract with another firm at a cost of ₹28.50 crore for procurement of the same AP Plant.

This resulted in an extra expenditure of ₹1.94 crore besides delay in setting up of the plant.

(Paragraph 3.4)

Loss of ₹62.10 crore on replacement of defective ammunition to Army by Ordnance Factory, Badmal

Ordnance Factory, Badmal (OFBL) supplied 155mm ammunition in March 2009 and March 2010 to the Army by filling it with TNT mix. Army reported exudation of TNT mix explosives from the shells of ammunition within their shelf life. This was on account of lower set point (melting point) of TNT than the specified range. Required test of set point value of TNT in TNT mix were not carried out at OF Badmal before filling in shells due to absence of provision for such testing in the CQA's specification.

CQA (ME), Pune had stated (May 2017) that by not mentioning set point clause in the specifications does not mean to refrain from set point testing of TNT mix. CQA was silent on how, despite having no such checks by the Factory, its quality assurance establishment (SQAE) cleared the ammunition for issue to the Army.

Finally, lack of availability of test provision for set point of TNT mix led to a loss of ₹62.10 crore on account of replacement of defective ammunition by the OFB.

(Paragraph 3.5)

Injudicious procurement of shell filling machine at a cost of ₹21.46 crore at Ordnance Factory, Chanda

Improper assessment of available filling capacity of 130mm RVC/FVC ammunition *vis-a-vis* Army's requirement led to injudicious procurement of one Screw Filling machine at OF, Chanda. The machine was received in January 2017. Further, the preparatory civil works related to construction of building could not be completed as of December 2018.

The machine was commissioned in December 2017 in another production shop engaged in the pour filling of 105mm ammunition. This was done despite supplier's advice against commissioning of the machine in the hazardous atmosphere of pour filling.

The machine valuing ₹21.46 crore has thus remained idle since its commissioning in December 2017.

(Paragraph 3.6)

Chapter- I: Performance of Ordnance Factory Board

1.1 Introduction

1.1.1 Ordnance Factories are the oldest and the largest organisation in India's Defence industry with a history that dates back to 1787 when a gun powder factory was established at Ishapore. The Ishapore factory had started production in 1791. There are 41 Factories including two Factories at Nalanda and Korwa, which are at project stage since 2001 and 2007 respectively. These factories are divided under five clusters or operating groups (**Table 1**). They produce a range of arms, ammunition, armoured and infantry combat vehicles and clothing items including parachutes for the Defence Services. The Ordnance Factories function under the Ordnance Factory Board (OFB), which is under the administrative control of the Department of Defence Production, Ministry of Defence.

Table 1: Group-wise number of Factories

Operating group	Number of factories
Ammunition & Explosives (A&E)	11
Weapons, Vehicles and Equipment (WV&E)	10
Materials & Components (M&C)	8
Armoured Vehicles (AV)	7
Ordnance Equipment Factories (OEF)	5
Total	**41**

Source: Annual Accounts of Ordnance Factories–2017-18

The major objectives of the OFB are:

- To supply quality arms, ammunition, tanks and equipment to armed forces;
- To modernise production facilities to improve quality;
- To equip themselves with technologies through Transfer of Technology and in-house Research & Development; and
- To meet customer satisfaction and expand consumer base.

1.2 Performance of Ordnance Factory Board

The data on key areas of management in the OFB for the five years 2013-18 are summarised in **Table 2**. **Annexure I** gives the details segregated across operating groups.

Table 2: Year-wise Financial Performance

(₹ in crore)

		Years					
		2013-14	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**Variation between 2017-18 and 2016-17 (%)**
I	**Financial Performance**						
	Revenue expenditure						
1	Budget Estimate (BE)	13,856	14,317	14,706	17,583	19,213	9
2	Final Grant	12,954	13,617	14,750	16,758	14,793	(-) 12
3	Actual Revenue expenditure (% utilization to Final grant)	12,834 (99)	12,832 (94)	14,133 (96)	16,403 (98)	14,563 (98)	(-) 11
4	Excess(+)/Savings(-) (3)-(2)	(-) 120	(-) 785	(-) 617	(-) 355	(-) 230	(-) 35
5	Cost of issues to indentors	15,783	16,380	18,457	20,194	19,803	(-) 2
6	Value of issues to indentors	16,122	16,664	18,624	20,876	20,310	(-) 3
7	Profit (6) - (5)	339	284	167	682	507	(-) 26
	Capital expenditure						
8	Budget Estimate	436	1,207	760	736	804	9
9	Final Grant	466	765	687	715	804	12
10	Capital expenditure (Actual)	465	746	680	717	797	11
11	Excess (+)/Savings (-) (10)-(9)	(-) 1	(-) 19	(-) 7	2	(-) 7	(-) 450
II	**Cost of Production (CoP): Components**						
12	Cost of stores	9,303	9,269	10,555	11,248	10,882	(-) 3
13	Cost of labour	1,705	1,959	2,040	2,261	2,335	3
14	Other costs *i.e.* Direct Expenses	239	274	298	353	346	(-) 2
15	Overheads	4,389	4,973	5,401	6,175	6,564	6
16	**Total Cost of Production**	15,636	16,475	18,294	20,037	20,127	-
17	Overheads as % of COP (15/16*100)	28	30	30	31	33	6
18	Labour costs as % of COP (13/16*100)	11	12	11	11	12	9
III	**Inventory**						
19	Stores-in-hand	5,588	5,906	6,739	7,113	7,566	6
20	Work-in-progress (WIP)	3,538	3,817	4,146	4,338	4,648	7
21	Stores-in-transit	854	887	988	944	847	(-) 10
22	Finished goods/components	1,305	1,698	1,535	1,363	1,687	24
23	**Total inventory**	11,285	12,308	13,408	13,758	14,748	7
24	Inventory as % of COP	72	75	73	69	73	6
25	WIP as % of COP	22	23	23	22	23	5
IV	**Labour & Machines**						
26	Numbers of direct industrial employees (DIEs)	46,206	44,464	43,002	42,382	41,387	(-) 1
27	Ratio of DIEs : Supervisory officers	1.5 : 1	1.5 : 1	1.4 : 1	1.4 : 1	1.5 : 1	0
28	Production per employee (₹ in thousands)	1,680	1,821	2,059	2,317	2,392	3
V	**Issues: Indentor-wise**						
29	Army	8,609	9,098	10,202	11,489	11,448	-
30	Air Force and Navy	539	562	719	822	945	15
31	Other Defence Departments	147	164	221	203	180	(-) 11
32	Central Paramilitary Police Organizations (Ministry of Home Affairs)	782	650	571	849	835	(-) 2
33	Civil trade including Exports	1,046	889	1,032	1,069	843	(-) 21

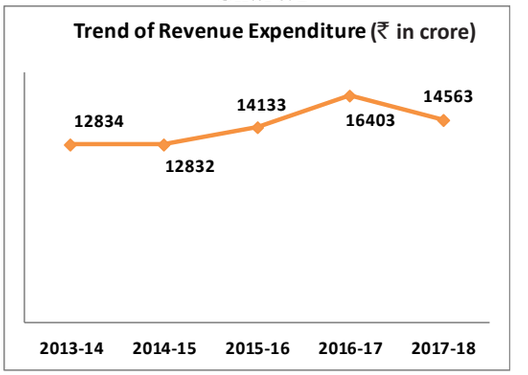
		Years					
		2013-14	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**Variation between 2017-18 and 2016-17 (%)**
34	IFD supplies[1]	4,999	5,301	5,879	6,444	6,059	(-) 6
35	**Total issues**	16,122	16,664	18,624	20,876	20,310	(-) 3
36	**Net issues to Users**	11,123	11,363	12,745	14,432	14,251	(-) 1
VI	**Research & Development**						
37	Expenditure on R&D	43	56	88	60	70	17
38	R&D expenditure as % of total revenue expenditure	0.34	0.44	0.62	0.37	0.48	30
Source : Budget & Expenditure Statement of OFB and Annual Accounts of Ordnance Factories							

Our analysis of trends from the data in **Table 2** is discussed in the succeeding paragraphs.

Budgeting

1.2.1 Revenue expenditure

Chart:1



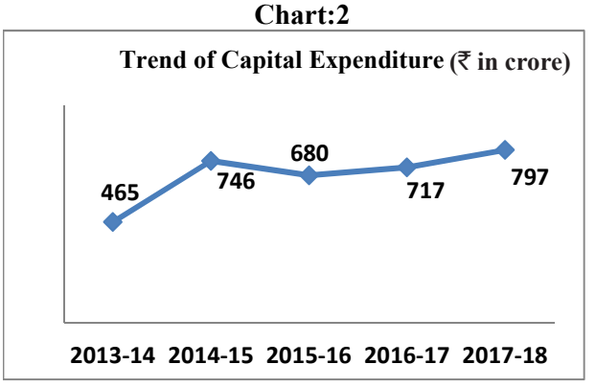
The Ordnance Factory Board receives budgetary grant under Grant No 20 - Ministry of Defence (Miscellaneous) to meet its running expenses *i.e.,* the revenue expenditure. The total grant was ₹14,793 crore in 2017-18. The Major Head 2079-Defence Services-Ordnance Factories is operated for booking its expenses while recoveries against issues to the Defence establishment are shown under Minor Head 901 to 904. Sale of products to non-defence establishments are shown under Receipt head under the Major Head 0079.

Significantly, the expenditure on Stores: ₹6,078 crore which represented 42 *per cent* of the total Revenue expenditure, decreased by 23 *per cent* in 2017-18 over 2016-17.

[1]IFD: Inter Factory Demand, whereby sister factories feed the need for stores of other factories.

1.2.2 Capital expenditure

Chart:2

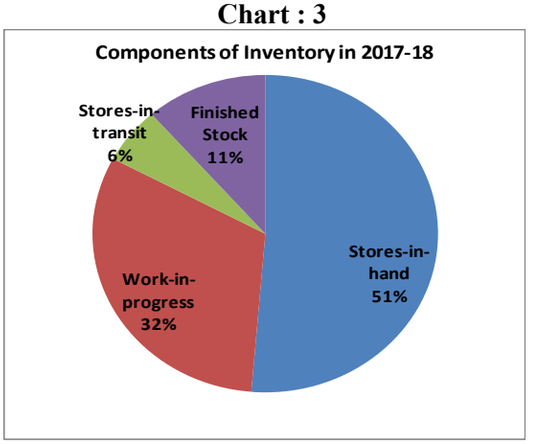


The OFB also receives budgetary support for capital expenditure (Major Head 4076-Capital Outlay-Defence Services-04-Ordnance Factories), also called the New Capital (NC) grant. This grant meets the expenditure on new projects including procurement of plant and machinery, for which ₹797 crore was spent in 2017-18.

Capital expenditure under NC grant represented only four to five *per cent* of the total expenditure of the OFB over the last five years. However, 11 *per cent* increase in capital expenditure was reported in 2017-18 over last year **(Chart 2)**.

1.2.3 Inventory holding

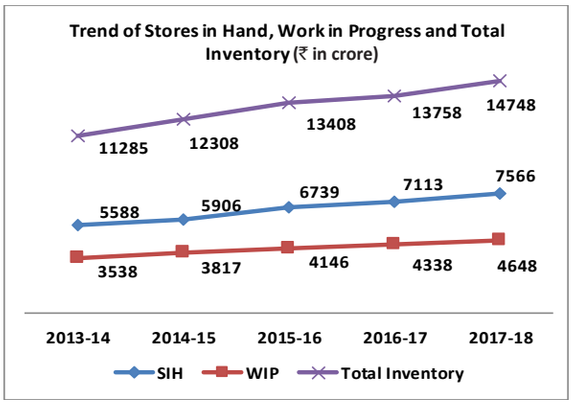
Chart : 3



The inventory holding in the Factories increased by 31 *per cent* from ₹11,285 crore in 2013-14 to ₹14,748 crore in 2017-18. However, there was a marginal increase of 7 *per cent* in 2017-18 over the holding in 2016-17. The level of holding is high representing 73 *per cent* of Cost of Production in 2017-18. More than half of the inventory is the stores-in-hand (**Chart 3).** The stores-in-hand *i.e.*, stores procured for manufacture but not used within the year by the Factories under the OFB, has shown an increasing trend in the last five years 2013-18.

Stores-in-hand as on 31 March 2018 was ₹7,566 crore which included non-moving stores, slow moving stores and surplus/scrap/waste/obsolete stores amounting to ₹1,055 crore. Thus, inclusion of non-active stores into stores-in-hand resulted in over-statement of active stores by ₹1,055 crore.

Chart : 4



The major contributing factors in accumulation of stores-in-hand are (i) cancellation or short-closure of orders mainly due to slippages in production, quality problems, *etc*; (ii) mid-way reduction of targets leading to the stores rendered surplus; and (iii) over-provisioning of stores by the factories, *etc.* Action at appropriate level is required to be initiated for prompt disposal of inactive and surplus stores.

For these purposes, the following actions are suggested:

- A Standing Committee may be constituted by OFB to declare any store item obsolete after thorough examination;
- Age-wise analysis of non-moving stores should be disclosed in the relevant Financial Statement;
- Loss provision towards obsolete/damaged items may be made for an amount equivalent to book value of the item less scrap value; and
- Reconciliation between MIS and Bin Card is essentially required.

The Work-in-progress (items in semi-finished state of manufacture) has also increased during the period (**Chart 4**).

1.2.3.1 Work-in-progress and pending warrants of production

The General Manager of an Ordnance Factory authorises a production shop to manufacture an item of requisite quantity by issue of a warrant (production order to undertake manufacture according to the yearly production plan of OFB) whose normal life is six months. Unfinished items pertaining to different warrants lying at the shop floor constitutes the work-in-progress (WIP). High level of holding of WIP is an area of concern in Ordnance Factories.

Table 3:Work-in-Progress

(₹ in crore)

Year	Cost of Production (COP)	Total Inventory	Work in progress (WIP)	% of WIP to COP	% of WIP to Inventory
2013-14	15,636	11,285	3,538	22	31
2014-15	16,475	12,308	3,817	23	31
2015-16	18,294	13,408	4,146	23	31
2016-17	20,037	13,758	4,338	22	31
2017-18	20,127	14,748	4,648	23	32

Source : Annual Accounts of Ordnance Factories for 2017-18

It would be seen from the Table that WIP constitutes almost 31 *per cent* of the total inventory. WIP also constituted almost 23 *per cent* of the Cost of Production (COP) in the last five years. Keeping in view the high holding of WIP, an effective action is required for early conversion of unfinished items into finished products.

The total value of WIP as on 31 March 2018 increased by seven *per cent* over the previous year 2016-17. A large number of warrants (29,393 numbers valuing ₹4,648 crore) particularly old warrants are outstanding, of which 4,987 warrants (17 *per cent*) pertained to more than one year, the oldest being from the year 2009-2010. The number of outstanding warrants was very high in Heavy Vehicles Factory Avadi (4,313 numbers) and Opto Electronic Factory Dehradun (3,193 numbers).

Table 4: Outstanding warrants

Outstanding warrants		***(₹in crore)***
	Number	**Value**
Less than 1 year	24,406	3,406
1 to 3 years	4,887	922
More than 3 years	100	320
Total	**29,393**	**4,648**

Source : Review of Annual Accounts for 2017-18

Necessary action is required to be taken by the OFB for closure of warrants outstanding for more than six months particularly those pertaining to more than three years.

There is an increasing trend of accumulation of work-in-progress over last three years. Thus, there is a need to declare Accounting Policy for making loss provisions for outdated WIP. If there is no further scope to convert WIP to finished article for some techno-commercial ground and loss is foreseen, the loss provision equivalent to expenditure booked in warrant less scrap value, if any, should be made in the Financial Statements after thorough review of old WIP.

Age-wise analysis of WIP should, therefore, be disclosed in the Financial Statement in a sample format suggested below:

Open Warrants	No. of Warrants	Value of WIP
Up to 6 months		
More than 6 months to one year		
More than 1 year to 3 years		
Above 3 years		

1.2.3.2 Stores in Transit

Ordnance Factory supplies (consignor) products or stores to the indenting factory (consignee) against an Inter Factory Demand (IFD). The supply is made along with Priced Issue Voucher, Quality Assurance Certificate and Inspection Note. The consignee factory takes on charge the stores on receipt of the same after inspection and prepares receipt voucher. In the accounts of consignee factory, there are cases where the IFD stores have been received but not taken on charge by the consignee factory, while the corresponding Priced Issue Voucher has been received. The consignee factory books these items as "Stores in Transit (SIT) - Outstanding Assets". SIT arises due to non-preparation of receipt vouchers by the consignee factories.

In the OF Organisation, the trend of SIT as percentage of IFD production over last five years is indicated below:

Table 5 : Stores in Transit

(₹ in crore)

Year	IFD production	SIT	SIT as % of IFD
2013-14	5,571	853	15%
2014-15	5,430	887	16%
2015-16	5,725	988	17%
2016-17	6,212	944	15%
2017-18	6,375	847	13%

SIT has constituted around 15 *per cent* of the total cost of IFD production during the last five years in OF Organisation. SIT, in such a quantity, not only results in idling of stores but is also one of the contributing factors for shortfall in production against annual production target.

Audit had previously highlighted (Paragraph 3.3 of C&AG Report No. 8 of 2018), the deficiencies in preparation and linking of vouchers by the factories. The factories were not adhering to the laid down accounting procedure for regularisation of rejected stores. These were resulting in accumulation of stores as SIT. Audit had indicated the need of a mechanism for periodical inter-factory reconciliation and physical verification of SIT. Besides, monitoring at the factories was to be made effective for time bound clearance of the long pending SIT cases.

OFB issued (October 2017) guidelines to all the OFs for accounting of IFD transactions with a view to reducing the quantum of SIT in OFs. However, it can be seen from the above table that SIT has marginally reduced from ₹944 crore (2016-17) to ₹847 crore (2017-18).

OFB further issued certain amendments (July 2018) to the guidelines, impact of which would be seen on the SIT of 2018-19.

Audit is of the view that accounting policy of the OFB may consider for disclosure of non-moving, obsolete and rejected items included in the SIT and for making necessary loss provision. Further, age-wise analysis of non-moving stores may be made and the cost of some percentage of the same stores which were more than 03 or 05 years old may be taken as loss provisions. So far as obsolete and damaged stores are concerned, cost of stores above scrap value may be provided for losses.

1.2.3.3 Physical verification of stock

Factories are required to conduct stock verification of all inventory items as per the laid down norms: high value items[2] are verified twice a year and the rest are verified annually. The General Manager of a Factory is responsible for this exercise. Scrutiny of records of stock verification in Ordnance Factories revealed that stock was not verified in respect of 30 *per cent* items (3.28 lakh items out of 10.91 lakh) during 2017-18. No Stock verification was carried out in six Factories: Ordnance Factory Badmal, Grey Iron Foundry Jabalpur, Heavy Alloy Penetrator Factory Trichy, Ordnance Clothing Factory Avadi, Ordnance Factory (Project) Korwa and Ordnance Factory (Project) Nalanda.

Thus, the actual position of stores is to be viewed in the light of non-verification of 3.28 lakh stores which pose a very serious risk in material management. Ordnance Factory Board may strengthen the stock verification system in Ordnance Factories to reconcile the actual physical balance of stores *vis-à-vis* balance in Bin Card.

[2] The top 70 to 80 *per cent* of annual consumption is regarded as high value items

1.2.4 Ability to meet Production Targets

The production targets to factories are fixed by the OFB in consultation with the Defence Forces. These targets are drilled down to the factories: for final products and for feeder factories, which are then communicated by the OFB to the factories. The setting of targets takes into consideration the requirements projected by the Forces and the capacity of the factories for production. It is observed (**Table 6**) that production in factories continued to fall short of targets. The factories could achieve targets for only 49 *per cent* of items in 2017-18.

Table 6: Production Targets and Achievements

(in number of items)

Year	Target	Achievement	% of Shortfall
2013-14	382	163	57
2014-15	693	251	64
2015-16	580	194	67
2016-17	576	249	57
2017-18	446	220	51

Source : Target and Achievement Report of the OFB

Table 7: Details of outstanding Indents on Factories

Item/Factory involved	Quantity ordered (2014-18)	Quantity issued up to March 2018	Quantity outstanding as of March 2018	Percentage of quantity outstanding for supplies	Value of outstanding indent (₹ in crore)	Outstanding since
125mm High Explosive (HE) (OF Chanda)	[redacted]	[redacted]	[redacted]	87	506	2015-16
30mm High Explosive/ Incendiary (HE/I) (OF Khamaria/OF Badmal)	[redacted]	[redacted]	[redacted]	83	1,322	2014-15
RKT 214mm Pre-Formed Fragmentation (PFF) PINAKA (OF Chanda)	[redacted]	[redacted]	[redacted]	62	1,167	2016-17
125mm High Explosive Anti Tank (HEAT) (OF Chanda)	[redacted]	[redacted]	[redacted]	46	173	2016-17

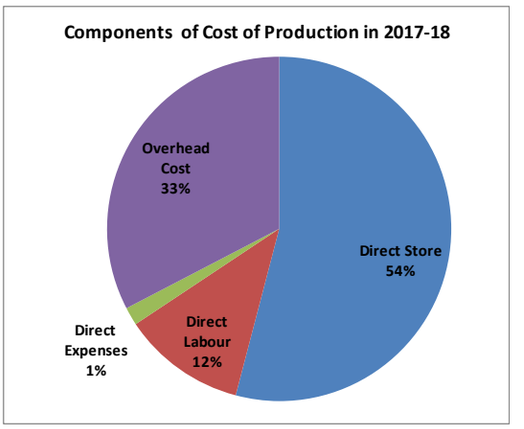
Source : Army's second Roll-on-Indent dated 15.10.2013 and Annual Accounts of Ordnance Factories

From the year 2009, Army is placing five-year Roll-on-indent on OFB for the ammunition items with year-wise breakup of targets. Army placed their second consolidated indent (October 2013) for ammunition items covering the period from 2014-15 to 2018-19. It would be seen from **Table 7** that a significant quantity of Army's demand for some principal ammunition items remained outstanding as of 31 March 2018 which may adversely affect their operational preparedness.

1.2.5 Cost of Production

Cost of Production in Ordnance Factories comprises direct material, direct labour and overheads. The Cost of Production during 2017-18 at ₹20,127 crore showed marginal increase over the figures of 2016-17. Five Ordnance Factories[3] contributed a total increase of ₹531 crore in the Cost of Production over the previous year. Amongst it, seven[4] principal items showed a total increase of ₹1,017 crore in Cost of Production.

Chart 5



Stores account for 54 *per cent* of the Cost of Production in the Ordnance Factory Board. Overheads at 33 *per cent* of the Cost of Production are particularly high in the Ordnance Factory Board as depicted in **Chart 5.** The composition of costs varies across operating groups (**Annexure I**) with the Armoured Vehicle (AV) Group and the Ammunition and Explosive (A&E) Group being the most material intensive. The Ordnance Equipment Group manufacturing clothing and general purpose items was the most labour intensive among the Factories.

1.2.5.1 High Cost of Overheads

Overheads charged in Ordnance Factories include indirect labour cost, indirect stores, supervision, electricity, transportation, depreciation, *etc*. The cost of Overheads accounted for 28 to 33 *per cent* of the Cost of Production during 2013-18. Major elements of the Overheads are supervision charges and indirect labour cost which together occupied 56 to 65 *per cent* of total Overhead costs during 2013-14 to 2017-18.

[3]HVF Avadi, OF Khamaria, OF Chanda, OLF Dehradun, OF (P) Nalanda

[4] Turret Assy (T-90 Gun), BMP-II (OE), Final Assy of T-90 tank, System 1A-43, M-92 BMCS Module, cartg 105 mm IFG NC and TI-ESSA Sight Fully Formed

Table 8: Cost of Overheads

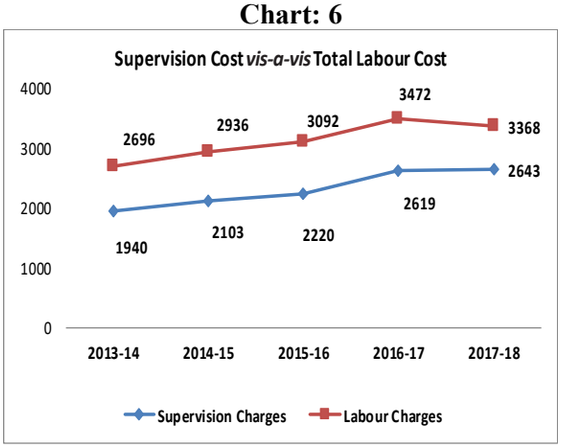
(₹in crore)

Year	Cost of Production (COP)	Overhead Cost /percentage of COP	No. of Supervisors	Supervision Charge/ percentage of Overhead Cost	No. of Direct Industrial employees	No. of Indirect Industrial employees	Indirect Labour Cost/ percentage of Overhead Cost
2013-14	15,637	4,389	30,740	1,940	46,206	16,144	940
		(28%)		**(44%)**			**(21%)**
2014-15	16,476	4,973	29,713	2,103	44,464	16,293	954
		(30%)		**(42%)**			**(19%)**
2015-16	18,294	5,401	29,990	2,220	43,002	15,230	1,024
		(30%)		**(41%)**			**(19%)**
2016-17	20,037	6,175	29,386	2,619	42,382	14,699	1,211
		(31%)		**(42%)**			**(20%)**
2017-18	20,127	6,564	28,309	2,643	41,387	14,444	1,034
		(33%)		**(40%)**			**(16%)**

Material and Components Group with some of the oldest factories of the OFB reported the highest levels of Overheads as much as 40 *per cent* of the Cost of Production.

The main reasons for high supervision charges and indirect labour cost are holding of excess supervisory staff compared to number of industrial employees (IEs)[5], non-reduction of indirect IEs despite induction of new CNC machines, outsourcing of house-keeping, maintenance, store-keeping and material handling and irregular payment of piece work profit to indirect IEs.

Chart: 6



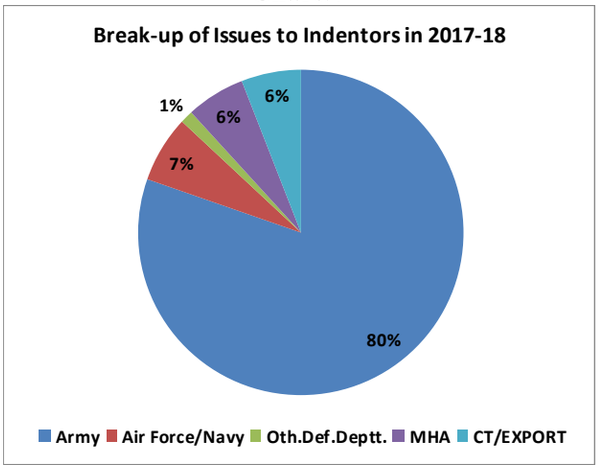
Audit noted that over the period 2013-18, the supervisory costs (**Chart 6)** in the OF Organisation increased by 36 *per cent*. In fact, for every two IEs, there was one supervisor. Supervisory cost as a percentage of total labour costs was 72 to 78 *per cent* during the period 2013-18. The number of indirect IEs stood at 35 for every 100 direct IEs during 2013-14 to 2017-18 which was very high. High supervisory costs lead to higher costs for the Armed Forces for the products manufactured by Ordnance Factories. Ministry of Defence may review the high cost of overheads and take appropriate corrective measures.

[5] IEs are production workers who are assigned with jobs at shop floor of the Factory

1.2.6 Value of Issues

Value of Issues is worked out as the number of items manufactured multiplied by the Issue Price fixed by OFB. Total Value of Issues in 2017-18 was ₹20,310 crore which included issues against Inter-Factory Demands (IFDs). Issues against IFDs are only input supplies for final production and issue to Users by the sister factories. Accordingly, the net issues to final Users were ₹14,251 crore only.

Chart:7



Among the final Users, Army is the major indentor for the products of the Ordnance Factories, accounting for nearly 80 *per cent* of the total issues during the year 2017-18 **(Chart 7)** with Air Force/Navy being second at seven *per cent*. Net issues to the final Users decreased from ₹14,432 crore in 2016-17 to ₹14,251 crore in 2017-18 mainly due to decrease in issues to the civil trade and decrease in export.

1.2.7 Pricing of products

Prices of Ordnance Factory products are fixed on actual cost of production (COP) incurred during previous three years with anticipated increase in cost of material, labour and overheads. Issue prices are fixed well in advance *i.e.* 18 months before the year of production. OFB follows different pricing policies for different categories of indentors. Issues to the Defence indentors are supposed to be on cost basis *i.e.* no profit should be charged on such issues. OFB is free to make profits from other clients in open market.

The Factories produced around 1,421 principal items in 2017-18. In 2017-18, OFB earned a surplus of ₹628 crore against issues to the Armed Forces which was against the principle of 'cost basis'. On the other hand, OFB sustained a loss of ₹153 crore in 2017-18 in issue of products to other factories as inputs for final products. Loss on inter factory issues would minimise the cost of production of the final product to that extent. Further, losses on issues to sister factories is a notional amount as the issue price is fixed by the OFs themselves. Therefore, Ministry needs to look into the surpluses and losses on issue to Users and under IFD.

1.2.8 Export activity

The export by OFB during 2013-14 to 2017-18 was very meager compared to total issues of the Board as detailed in the **Table 9**.

Table 9: Year-wise value of export

(₹ in crore)

Year	Total Issue	Value of Export	Percentage	Major Items exported	Country
2013-14	16,122	18.17	0.11	Catrg SA 5.56mm Ball	Czech, Tajikistan
2014-15	16,664	13.02	0.08	12.7 Prahari Gun	Mauritius
2015-16	18,624	6.64	0.04	12.7 Prahari Gun, Brake Parachute	Mauritius, Indonesia
2016-17	20,876	22.69	0.11	Kavach Launcher, CRN-91 Gun	Italy, Mauritius
2017-18	20,310	13.94	0.06	Round 84mm HEAT 551, Electric Sub System for Kavach Mod-II, Brake Para for SU-30	Kenya, Italy, Indonesia and Malaysia

It would be seen from the above table that the export constituted only around 0.06 *per cent* of the total issues during the year 2017-18. Value of exports has decreased by 39 *per cent* from ₹22.69 crore in 2016-17 to ₹13.94 crore in 2017-18. A road map for enhancement of export activity is required to be formulated.

1.2.9 Loss Statement awaiting regularisation

The General Manager of the Ordnance Factory is authorised to regularise loss due to rejection up to ₹2 lakh where there is negligence of the staff or officers of the factory and ₹10 lakh where there is no such negligence. All items above this are required to be referred to the Ordnance Factory Board. In case the loss is over ₹50 lakh, where there is no negligence or ₹20 lakh where there is negligence, the matter has to be referred to the Ministry of Defence (MoD) for regularisation.

Regularisation of loss is subject to investigation of the case by a Board of Enquiry to fix responsibility, which is expected to submit its report within two months. During 2017-18, ₹1.87 crore was written off against losses. However, a significant number of cases of loss have been pending for regularisation by the Ministry for years together. The **Table-10** depicts the loss

Table 10: Pending loss statement

Division	Number of cases	Money Value (₹in crore)	Pending since preparation of loss statement	Pending at MoD since its receipt from OFB
WV&E	41	6.68	8 to 34 years	6 to 18 years
A&E	129	102.77	4 to 34 years	1 to 15 years
M&C	19	5.48	2 to 37 years	2 to 5 years
AV	66	2.39	4 to 11 years	1 to 7 years
Total	**255**	**117.32**		

Source : MoD ID No. 4(15)/2017/D(Prod-II) dated 28.11.2018

statement awaiting regularisation at the Ministry of Defence over one year as on March 2018.

It would be seen from the above that as of March 2018, 255 cases of losses amounting to ₹117.32 crore were awaiting regularisation by the Ministry of Defence and oldest items pertain to November 1981. Losses awaiting regularisation were high in Ordnance Factory Khamaria (₹56.41crore) and Ordnance Factory Varangaon (₹19.32 crore). There is a need to strengthen the monitoring mechanism for expeditious regularisation of losses.

1.3 New Initiatives

1.3.1 Identification of core & non-core items

In order to improve operational efficiency, Ministry of Defence has identified non-core activities that can be either closed down or put on PPP model for optimal use of OFB's vast infrastructure and skilled manpower. Ministry has identified (April 2017) 143 items as non-core items under production with OFB. Out of them, 48 items are of OEF division, 12 items are of AV and WV&E division and 83 items are Inter Factory Demand (IFD) items.

Ministry has also decided that Army can procure these non-core items from trade without getting NOC from OFB and on the other hand OFB can participate in such tenders of Army and get orders on competitive basis. Non-core IFD items will be outsourced by OFB from trade subject to alternate utilisation of dedicated capacities, manpower and alternate development of trade sources.

There is a preparatory period of two years after which off-loading of non-core items in phased manner would commence. Regarding action plan to optimally utilise Ordnance Factories' infrastructure and manpower on off-loading of non-core items, OFB has decided that (i) Factories will manufacture all core items in-house; (ii) manpower engaged in the declared non-core items will be re-engaged in the production of core items; (iii) in absence of the indents for WV&E division, production line will be changed to manufacture other core items to utilise its capacity; and (iv) in case of outsourcing of non-core IFD items, capacities and manpower may not be outsourced without alternate utilisation. Hence, outsourcing will not result into surplus manpower or infrastructure.

In compliance with the Ministry's decision on production of non-core items, OFB has incorporated policy decisions in their new Procurement Manual –2018 (issued in August 2018) for procurement of stores. Para 2.2 (ii) of the new Procurement Manual stipulated that "Non-core activities should as far as possible be outsourced, if cheaper options can be found outside OFB & resources thus

released should be utilised for core activities". The issues related to production of core and non-core items would be examined in future audits.

1.3.2 Introduction of New Proforma Account

The Annual Accounts of the Ordnance and Ordnance Equipment Factories are being maintained in two formats: traditional and commercial format. The format of traditional accounts does not conform to the principles of Commercial Accounting as (a) principles of consolidation is not followed in respect of Inter-factory transactions; (b) transactions outside Consolidated Fund of India, *viz.* Public Account of India are not reflected in the accounts; and (c) Profit/Loss is calculated after keeping a portion of cost out as "Kept out of Production charge".

New Proforma Accounts comprise Manufacturing Account, Profit & Loss Account and Balance Sheet with supporting Schedules. The introduction of commercial accounting system is a step towards facilitating commercially competitive decisions in an evolving environment in defence production with the entry of private sector.

While presenting the Proforma Accounts, Fund Outlay of the entity has been structured in the following manner:

a. Capital Outlay A/c
b. Revenue Outlay A/c
c. Reserves
d. Profit & Loss

Commercial Accounts are intended to be prepared, as far as possible, in conformity with the Generally Accepted Accounting Principle (GAAP) in India. Commercial Formats of these accounts are expected to clearly bring out the financial health of each Factory and OFB as a whole.

The important accounting issues and suggestions of Audit on the commercial format of Annual Accounts for the year ended March 2018 were as under:

(i) Accounting Heads: Balance Sheet, Schedule 13(B)

Completed Articles:

₹211.96 crore as on 31 March 2016
₹149.73 crore as on 31 March 2017
₹231.52 crore as on 31 March 2018

- The basis of valuation of store and finished article is different, therefore, proper classification of inventories is essential. Finished Articles should not be classified as WIP or Store in hand and *vice- versa.*
- Slow-moving, non-moving and obsolete inventory items need to be identified specifically every year with age-wise analysis. They also need to be disclosed in the Financial Statements.

(ii) Accounting Heads: Balance Sheet, Schedule 18

Sundry Creditors:

₹1113.35 crore as on 31 March 2016
₹1208.67 crore as on 31 March 2017
₹1453.09 crore as on 31 March 2018

In some cases, bills were received from suppliers in the Month of April or May of the next financial year but liability of the expenditure incurred for the current financial year were not recognised. A cut-off date needs to be fixed for accepting bills so that liability to the extent possible could be recognised in the Accounts.

(iii) Accounting Head: Balance Sheet, Schedule 14

Sundry Debtors /Amount Receivable:

₹173.98 crore as on 31 March 2016
₹186.30 crore as on 31 March 2017
₹746.02 crore as on 31 March 2018

It is necessary to obtain confirmation from the party appearing under Sundry Debtors in view of substantial increase in Sundry Debtors over last three years. Besides, party-wise and age-wise analysis of Sundry Debtors/Amount Receivables from MHA, other Central Government Departments, State/UTs, CPSUs/SPSUs, Private parties *etc.* is required to be disclosed in the Notes to Accounts. This would lead to better appreciation and accounting of Sundry Debtors.

(iv) Accounting Head: Balance Sheet, Schedule 15

Advance for stores not received:

₹891.80 crore as on 31 March 2016
₹1770.71 crore as on 31 March 2017
₹925.35 crore as on 31 March 2018

Accounting Head: Balance Sheet, Schedule 19

Advance received from Customer:

₹321.78 crore as on 31 March 2016
₹363.83 crore as on 31 March 2017
₹454.61 crore as on 31 March 2018

Party-wise and age-wise analysis of advances received from customers (MHA, Other Central Government Departments, States/UTs, PSUs, Private parties *etc.*) but stores not supplied and advance paid to suppliers but stores not received are required to be reconciled and disclosed in the Notes to Accounts.

(v) Closing of Accounts with incorrect closing Cash/Bank Balance

Accounts are to be closed with the balances as per Cash Books. Difference, if any, between the balance as per Cash Book and Bank Statement is to be reconciled by preparing Bank Reconciliation Statement, to ascertain the reasons for differences so that necessary corrective accounting entries can be passed in the books of accounts.

The preparation of Accounts, with inaccurate Cash Book balance, was not in order. As per the Annual Accounts (2017-18), the amounts lying in the General Manager (GM)'s Public Fund Account was ₹7.28 crore whereas the amount as per Cash Book balance of 41 Factories as on 31 March 2018 was ₹6.95 crore. Audit Scrutiny, revealed following reasons for discrepancy:

i. Five out of 41 Factories closed their accounts with the balances as per Bank Statements (₹589.94 lakh) instead of with the balances as per Cash Book (₹166.41 lakh);

ii. Thirty-one out of 41 Factories closed their accounts with the wrong Cash Book Balance (₹135.37 lakh) instead of correct Cash Book Balance (₹525.88 lakh).

Thus, Proforma Accounts prepared do not exhibit true and fair view of the state of affairs in the OF organisation. **Paragraph 3.2** of the report provides further details of the audit of the General Manager's (GM's) Public Fund Accounts.

1.4 Projects for creation/augmentation of production capacity

There were 15 ongoing projects for creation/augmentation of production capacity in Ordnance Factories at a total sanctioned cost of ₹5,567 crore. Status of the projects along with revised PDC and expenditure as on March 2018 is given in **Annexure-II**.

It could be seen from the **Annexure-II**, that the projects have been badly delayed and resulted in time and cost overrun. This ultimately affects the operational requirement of the Army.

Of these, in respect of 5 projects *viz.* setting up of propellant Factory at Nalanda, setting up of Ordnance Factory at Korwa, production of T-72 variants, production of T-90 Tanks and production of Pinaka Rockets in Ordnance Factories, Audit has commented in detail in previous C&AG's Audit Reports. In this Report, Audit has commented on placement of order on unqualified firm which led to delay and avoidable extra expenditure in the project for setting up of Special Chemical plant at High Explosive Factory (HEF), Kirkee **(Paragraph 3.4)**.

Apart from the above, another project was taken by OFB (March 2011) for 'creation of balancing facilities at M/s Midhani for manufacture of wide armour plates' at an estimated cost of ₹507 crore. Out of this, ₹307 crore was funded by OFB and balance ₹200 crore was invested by DRDO. As per the detailed project report, the project was to be completed by September 2014 which was revised to August 2017 and finally to May 2020. Major work of the project was establishment of Wide Plate Mill valuing ₹432 crore which is getting delayed. The cost of the Wide Plate Mill was revised to ₹481 crore for which M/s Midhani placed supply order (April 2017) on M/s Danielli, Italy. Thus, even after a lapse of over seven years from the initiation of the project, investment of ₹307 crore by OFB at M/s Midhani for the project could not accrue any benefit to the Government.

1.4.1 In-house Research & Development for new development/ up-gradation of existing products

Ordnance Factories had been undertaking research & development (R&D) mainly in the area of process improvement through their respective R&D Section/Cell. In 2007, OFB adopted a new policy on R&D to include development of new products and up-gradation of existing products. It ordered for formation of 12 Ordnance Development Centres (ODCs) with similar group of Factories under its ambit to have focused and dedicated approach towards in-house R&D activity in OFs.

During 2014-18, OFs had a population of 618 in-house R&D projects at a total sanctioned cost of ₹594.21 crore. Of these, 201 projects were completed, 92 were short-closed and 325 projects were going on as of March 2018.

1.5 Action taken on earlier Audit Paragraphs

With a view to enforcing accountability of the Executive in respect of all issues dealt with in various Audit Reports, the Public Accounts Committee desired that Action Taken Notes (ATNs) on all paragraphs pertaining to the Audit Reports for the year ended 31 March 1996 onwards be submitted to them duly vetted by Audit, within four months from the date of laying of the Reports in the Parliament.

Review of ATNs relating to the Ordnance Factories as of April 2019 indicated that ATNs on seven paragraphs included in the Audit Reports up to the year ended March 2017 remained outstanding, of which the Ministry had not submitted even the initial ATNs in respect of three paragraphs, revised ATNs are awaited from Ministry for two paragraphs and final ATNs are awaited for submission to Lok Sabha Secretariat for two paragraphs as shown in **Annexure-III.**

Lists of abbreviations and glossary of terms used in this report are given in **Appendix-I** and **Appendix-II** respectively.

Chapter- II: Production of Fuzes in Ordnance Factories

2.1 Introduction

Ordnance Factories (OFs) under the Ordnance Factory Board (OFB), manufacture and issue various types of ammunitions for Armed Forces. Fuze is an essential and critical part of any effective ammunition. It provides safe and reliable detonation of ammunition at the desired time and place.

Fuze contains sensitive explosive material in small quantity, which initiates explosion by detonating the explosive filling inside the shell body of ammunition. Absence of fuze makes the entire ammunition redundant and unfit for use. Safety features are built in all fuzes to protect users while handling ammunition during their storage, transit and deployment.

From the perspective of activation mechanism, fuze is mainly categorised into three types as mentioned below:

Time Fuze: It detonates after a set period of time, by using one or more combination of mechanical, electronic, pyrotechnic timers.

Impact Fuze: Impact, percussion or contact fuze detonates when its forward motion rapidly decreases on physically striking the target.

Proximity Fuze: It causes the ammunition to detonate when it comes within a certain pre-set distance of the target.

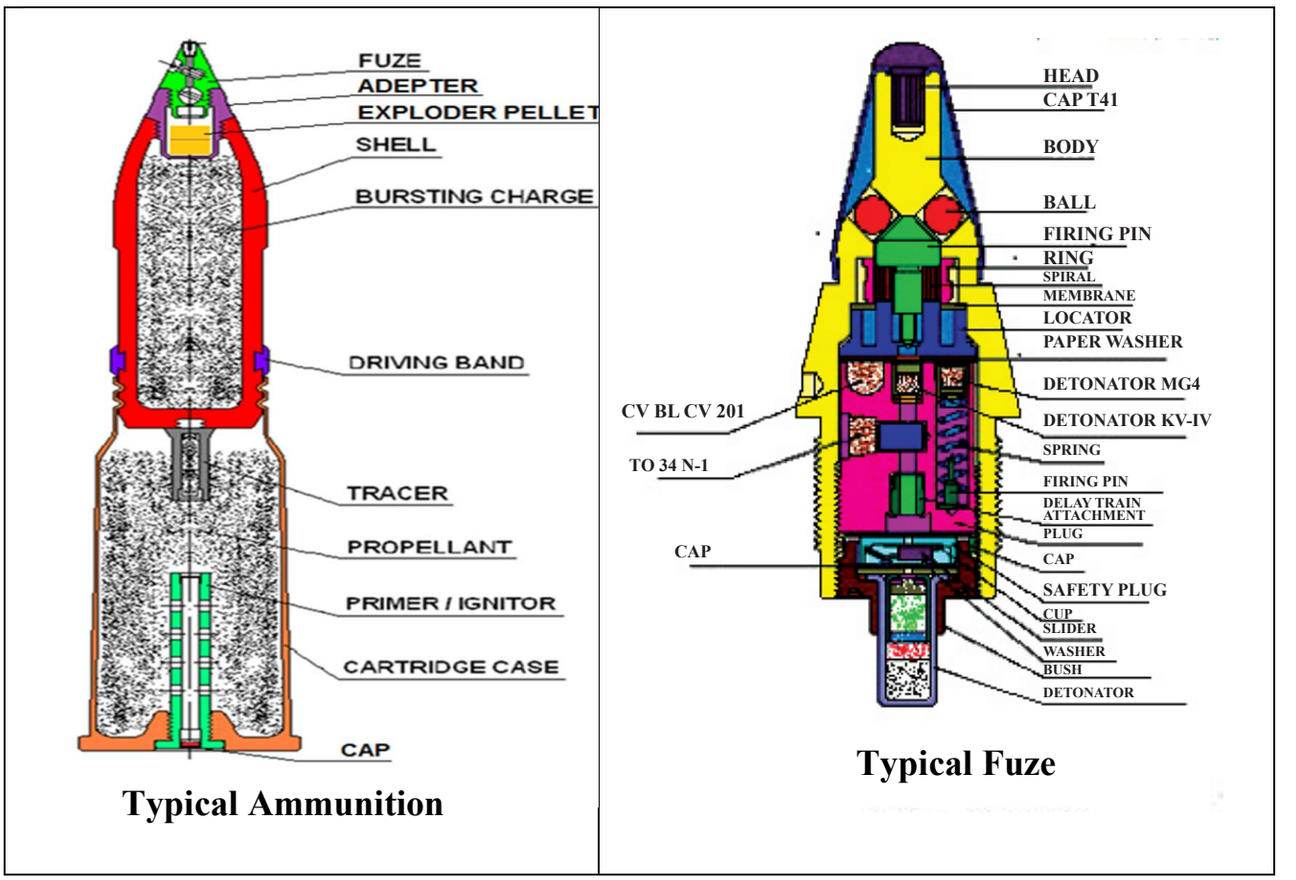
Based on the working mechanism, there are two types of fuzes *i.e.* mechanical and electronic. Electronic fuzes differ from mechanical fuzes in the method of fuze initiation where the target sensing and firing functions are achieved through electronic circuits. Electronic fuzes are light-weight and compact with more accuracy and reliability and therefore have an edge over mechanical fuzes. OFs mainly[6] manufacture mechanical fuzes. Presently, Electronic Corporation of India Limited (ECIL) and Bharat Electronics Limited (BEL) manufacture and supply electronic fuzes to Army.

Five[7] OFs manufacture empty fuzes for supply to the filling factories[8]. Filling factories fill empty fuzes as well as ammunition shells with explosives and

[6]Only one electronic fuze*viz*. FB-40 for 40 mm PFFC ammunition is manufactured by OFB.
[7] Gun and Shell Factory Cossipore (GSF), Ordnance Factory Ambajhari (OFAJ), Machine Tools Prototype Factory Ambarnath (MTPF), Ordnance Factory Dumdum (OFDC) & Ordnance Factory Khamaria (OFK)
[8] Ordnance Factory Chanda (OFCH), OFK, Ordnance Factory Badmal (OFBL), Ammunition Factory Kirkee (AFK) & Ordnance Factory Dehu Road (OFDR)

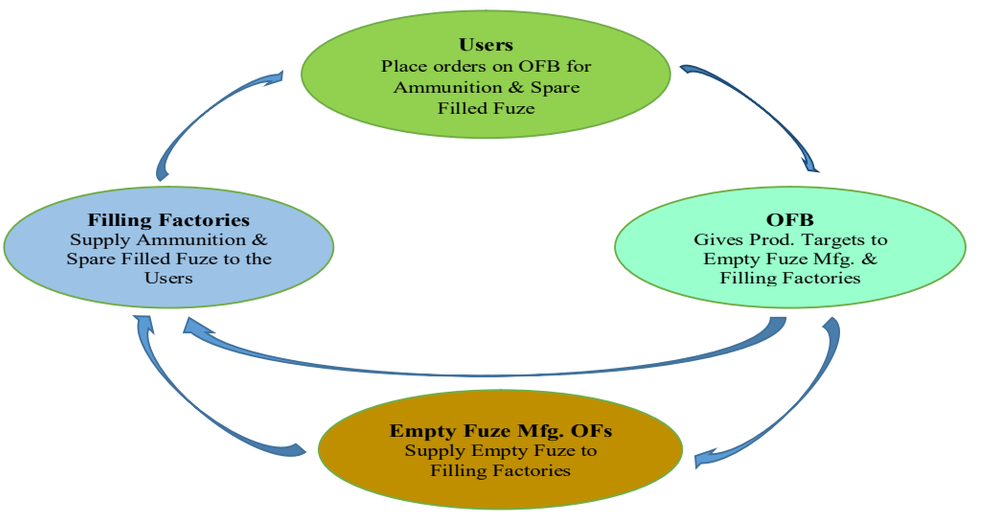
assemble it with other components *viz*. propellant, igniter, cartridge case, *etc*. to form complete ammunition **(Chart-8)**. Shelf life of the ammunition is more than that of its fuze. Therefore, in order to exploit the full life of the ammunition, Users require spare fuzes in addition to the fuzes assembled with the ammunition. OFs also procure empty/filled fuzes from trade firms and import. In all, OFs manufacture 25 types of fuzes.

Chart-8: Diagram of Ammunition and Fuze



Based on the indents (orders) of the Armed Forces (Users), OFB allocates production targets of ammunition and fuzes to the filling factories for issue to the Users. It assigns matching targets of empty fuzes to the concerned OFs. Assembled ammunitions as well as spare fuzes are issued to Users as depicted in **Chart-9** below:

Chart-9: Supply chain among Users, OFB and Ordnance Factories



During the period 2013-18, total cost of production of all filled fuzes manufactured by OFs was about ₹1900 crore.

2.1.1 Organisational structure for production and quality

Director General of Ordnance Factories (DGOF) is the Chairperson of OFB, which has nine Members. Five Members each heads one of the five operating groups of the factories and other four Members are responsible for staff functions *viz.* Personnel, Finance, Planning & Material Management and Technical Services. OFs involved in manufacture of fuzes/ammunition function under the control of Member (Ammunition and Explosives) who is responsible for policy formulation, production planning, supervision and monitoring of activities of OFs. Each ordnance factory is headed by General Manager (GM), who is responsible for ensuring timely and quality supply of fuzes/ammunition to the Users[9].

Directorate General of Quality Assurance (DGQA), Directorate General of Aeronautical Quality Assurance (DGAQA) and Directorate General of Naval Armament Inspection (DGNAI), which are independent of the OFB, are responsible for quality assurance of the products issued to the Users. DGQA/DGAQA/DGNAI discharge this function through respective Controllerates of Quality Assurance (CQA) for ammunition items. Senior Quality Assurance Establishments (SQAE), who are attached with the OFs, function under the concerned CQA.

[9] For empty fuze, User is the filling factory who fills the fuze and assembles it with the ammunition for issue to the Armed Forces.

Product specific Quality Assurance Plan (QAP) forms the basis of all quality checks carried out by factory QC and SQAE throughout the production process prepared jointly by the SQAE and the OFs. The Quality Control (QC) section of OFs is required to do 100 *per cent* check at designated stage/inter-stage of the manufacturing process and 100 *per cent* checks of finished fuzes as prescribed in the Quality Assurance Plan (QAP). QC inspection either clears the items or returns the items for rectification, which is termed as 'Returned for Rectification' (RFR).

Once the item is cleared by QC section, it is submitted to Quality Assurance (QA) establishments for overall quality assurance. In case of items being issued to Army, Senior Quality Assurance Establishment (SQAE) under Director General of Quality Assurance (DGQA) is the inspection authority. SQAE is required to give assurance on the process from verification of documents. For critical materials identified jointly by the OFs and SQAE, selective sample of input materials is required to be tested by SQAE without affecting the production.

The SQAE performs sample checks at Control points[10]and Surveillance Points[11] over the entire manufacturing process[12] including packaging. The SQAE also carries out final inspection of the finished fuzes on sampling basis for acceptance of the fuzes before issue to the Users. The final acceptance depends on successful proof test[13] of the fuzes which is conducted at various Proof Ranges under DGQA and DRDO.

In case of rejection of fuze in proof test, there are mainly two mechanisms *viz*. Joint Investigations (JI) by OFs and SQAEs and Failure Review Board (FRB) at factory level to investigate the causes of rejections. JIs and FRBs also suggest remedial measures.

In case of accident/ failure of fuze and ammunition at the Users' end, DGQA and OFB are required to conduct Defect Investigation for taking corrective measures.

[10] Control points (CP) are designated on completion of inter-stage manufacturing process where measurements and inspections are carried out to ensure that the intermediate product meets the specified quality parameters. Items are subjected to the next operation only after clearance in a particular CP check.
[11] Surveillance point checks are to be carried out as per the QAP on stages throughout the production line other than that covered under CP, the results of which do not affect the next stage of production.
[12] Pilot project undertaken since September 2016 in six OFs (OFK, OFBL, OFAJ, OFC, OFMK & GCF) for in process quality checks solely by factory QC section restricting the QA agency to only final inspection as per the Raman Puri Committee Report.
[13]Proof test is used to check fitness of the fuze for use by subjecting the same to deliberately intense testing/firing beyond normal operational capacity. There are two types of proof test- Static proof and Dynamic proof. (Details are in Glossary of Terms in Appendix II)

2.1.2 Audit objectives

The aim of this audit was to form an opinion on the OFB's ability to provide quality fuzes to the Users for various ammunition as per their indents.

The broad objectives of audit were to seek an assurance on whether:

1. ***the factories had adequate capacity and production of empty and filled fuzes to meet the Users' demand;***
2. ***the factories had adequate vendor base for procurement of required input materials in time with requisite quality;***
3. ***quality control/assurance mechanisms were strictly adhered to for manufacture of empty and filled fuzes; and***
4. ***research and development efforts were effective for up-gradation of existing fuzes and development of new fuzes.***

2.1.3 Audit criteria

Audit identified the following sources as audit criteria for drawing assurance on the audit objectives:

- Users' Indents for ammunitions/fuzes;
- OFB's Procurement Manual 2010 for stores, Standard Operating Procedures and DGOF Procedure Manual;
- Minutes of monthly Board meetings and various review meetings among the stakeholders;
- Standing Orders (Technical) for Defence Quality Assurance organisations;
- Defence Accounts Department Office Manual Part-VI (DADOM); and
- Policies/orders/instructions issued by the Ministry and the OFB

2.1.4 Scope of audit and sample

Audit covered the production performance of nine OFs[14] and OFB during 2013-14 to 2017-18. The findings were arrived at after test check of records of these units. Audit also collected inputs from the Users, DGQA/DGAQA/DGNAI, CQA(A) Kirkee, SQAEs attached with the OFs, proof establishments[15] and ECIL/BEL. Audit selected 15 out of 25 fuze items on the basis of criticality of Users' requirements of ammunition/fuzes and cost of production as detailed in **Table-11**.

[14] GSF, OFAJ, OFDC, MTPF, OFK, OFCH, OFBL, AFK & OFDR
[15] LPR Khamaria, CPE Itarsi and PXE Balasore

Table-11: Details of sample of Fuzes selected for Performance Audit

(₹in crore)

Sl. No.	Name of Fuze	Related Ammunition	Factory (empty fuze)	Factory (filled fuze)	Cost of Production (FY 2013-2018)
1	A670M	30mm High Explosives (HE)/Incendiary & Tracer	OF Ambajhari (OFAJ), Gun & Shell Factory Cossipore (GSF), OF Khamaria (OFK)	OF Khamaria (OFK), OF Badmal (OFBL)	110.59
2	104	40mm L-70 HE/Incendiary & Tracer	OF Khamaria (OFK)	OF Khamaria (OFK)	147.19
3	FB-40	40mm Pre-Formed Fragmented Cubes (PFFC)	Machine Tools Prototype Factory, Ambarnath (MTPF)	OF Chanda (OFCH), OF Khamaria (OFK)	144.47
4	DA5A	51mm HE	Gun & Shell Factory, Cossipore (GSF)	Ammunition Factory Kirkee, (AFK) OF Badmal (OFBL)	353.13
5	DA162 MK-8	81mm HE & Plasticized White Phosphorus (PWP)	OF Ambajhari (OFAJ), Gun & Shell Factory Cossipore (GSF), OF DumDum (OFDC)	Ammunition Factory Kirkee (AFK), OF Badmal (OFBL), OF Chanda (OFCH)	194.82
6	447	84mm HE FFV 441	Trade	OF Khamaria (OFK)	127.58
7	64-C	84mm Illuminating	Gun & Shell Factory Cossipore (GSF)	OF Khamaria (OFK)	74.73
8	117 MK-20	105mm HE	Trade	Ammunition Factory Kirkee (AFK), OF Badmal (OFBL), OF Chanda (OFCH)	454.55
9	162 MK-9 (M-1)	120mm HE &PWP	OF Ambajhari (OFAJ), Gun & Shell Factory Cossipore (GSF), OF DumDum (OFDC)	Ammunition Factory Kirkee (AFK), OF Chanda (OFCH)	79.87
10	B-15	125mm HE Anti-Tank (HEAT)	Gun & Shell Factory Cossipore (GSF)	OF Chanda (OFCH)	13.10
11	B429E	125mm HE	OF Ambajhari (OFAJ)	OF Chanda (OFCH), OF Badmal (OFBL)	79.33
12	B429	130mm Full Variable Charge (FVC) & Reduced Variable Charge (RVC)	OF Ambajhari (OFAJ)	OF Chanda (OFCH), OF Badmal (OFBL)	0.00*

Sl. No.	Name of Fuze	Related Ammunition	Factory (empty fuze)	Factory (filled fuze)	Cost of Production (FY 2013-2018)
13	Fuze Mine Combination	Anti-Personnel Mine (APM-16)	Gun & Shell Factory Cossipore (GSF)	Ammunition Factory Kirkee (AFK)	87.90
14	213 MK-5 (M-2)	105mm Illuminating	Trade	OF Dehu Road (OFDR)	18.99
15	B-25mm	140mm Rocket	Trade	OF Khamaria (OFK)	0.53
				Total	**1886.78**

*****_There was no final production/issue of filled fuzes due to quality issues._

As could be seen from above, cost of sampled fuze items in five years was ₹1,887 crore. This is around 99 *per cent* of the total cost of production of all 25 fuzes.

Presently, OFB has no production line for mechanical fuze of 155mm artillery ammunition. Army procures electronic fuzes for this ammunition from ECIL. Hence, fuze for 155mm ammunition was not covered in audit.

Audit also covered 14 in-house Research and Development (R&D) projects in respect of four of selected fuzes as well as development of new fuzes (not in OFB's product line).

Photographs of critical ammunition and their uses are depicted in **Chart-10** below:

Chart 10: Ammunition and related Fuze items

 **30mm HE/I**: Fired from Gun of Infantry Combat Vehicle against men and non-armoured ground and aerial targets. **(Fuze: A670M)**	 **40mm L/70:** Fired from L-70 Gun to hit high speed aircraft flying at low altitude. **(Fuze: 104)**	 **40mm PFFC:** Used against aircraft and sea skimmer missile threats. **(Fuze: FB-40)**
 **51mm (HE):** Fired from Mortar to hit personnel/targets beyond the immediate firing range. **(Fuze: DA5A)**	 **81mm (HE):** Fired from Mortar in battlefields, mountain warfare or air borne operations. **(Fuze: 162 MK-8)**	 **84 mm Illg:** Fired from 84mm Rocket Launcher for quick illumination of target areas. **(Fuze: 64-C)**

 **84 mm HE:** Fired from Gun 84mm Rocket Launcher against enemy troops in trenches, machine gun post and transport vehicles. **(Fuze: 447)**	 **105mm Illuminating:** Used from field gun for illumination in night warfare. **(Fuze: 213 MK-5 M-2)**	 **120mm PWP**: Fired from Mortar to create dense smoke facilitating tactical deployment of own troops and vehicles. **(Fuze: 162 MK-9 M-1)**
 **125mm HE:** Fired from Tank T-72 Gun to destroy enemy shelters, vehicles and personnel. **(Fuze: B-429E)**	 **125mm HEAT:** Fired from Tank T-72/T-90 against enemy tank, gun, mortar and heavy armoured targets. **(Fuze: B-15)**	 **130mm FVC/RVC:** Fired from long range field gun to destroy enemy artillery, tanks, pill boxes and strong field works. **(Fuze: B-429)**

2.1.5 Audit methodology

The audit objectives and criteria were discussed with the OFB during an Entry Conference held in May 2018. The field audit was conducted during April-July 2018 to evaluate the performance against the audit criteria. Field audit included examination of records, collection of information through issue of requisitions and audit memos.

Audit issued the Draft Report to the Ministry and OFB on 5 December 2018. Audit discussed the Report in the Exit Conference with OFB on 13 March 2019. OFB's reply (March 2019) and deliberations in the Exit Conference have been considered while finalising this Report. Ministry's reply was awaited as of June 2019.

2.1.6 Acknowledgement

Audit acknowledges the co-operation from the Chairman and concerned Members of the OFB, Senior General Managers/General Managers of the OFs and Heads of the attached QA Establishments.

Audit findings

The Audit findings have been broadly divided into (a) lack of capacity of production of empty and filled fuzes, (b) shortfalls of production against targets, (c) audit findings on procurement of input materials, (d) quality problems during the production and fuzes issued to the users and (e) R&D efforts. The same are discussed in succeeding Paragraphs.

2.2 Production Planning and Capacity

The Users place indents[16] on OFB for ammunition/spare fuzes which are in product-line of OFs. OFB fixes annual production targets for filled ammunition and spare fuzes to filling factories and for empty fuzes to other feeder factories. This is done on the basis of Users' requirement and production capacities of OFs. The production targets form the basis for procurement and production planning by the OFs to ensure timely delivery of the targeted products to the Users/filling factories.

2.2.1 Deficiency in capacity-building *vis-à-vis* Users' requirement

The matching of production capacity in OFs with the User's requirement is a pre-requisite for fixing realistic production targets to meet the requirement.

Army projected (May 2014) long term requirement for major ammunitions to OFB. Based on Army's requirement and last three years' average demand of other indentors[17] for ammunitions assembled with fuzes and spare fuzes, OFB assessed (August 2014) the requirement of empty fuzes and available production capacity in OFs.

Details of Users' requirement, production capacity and required augmentation in production capacity of empty as well as filled fuzes are given in **Table-12** below.

[16]Army placed second Roll-on-Indent (2014-19)
[17]Long term requirement of Air Force, Navy & MHA not available with OFB for common ammunition items.

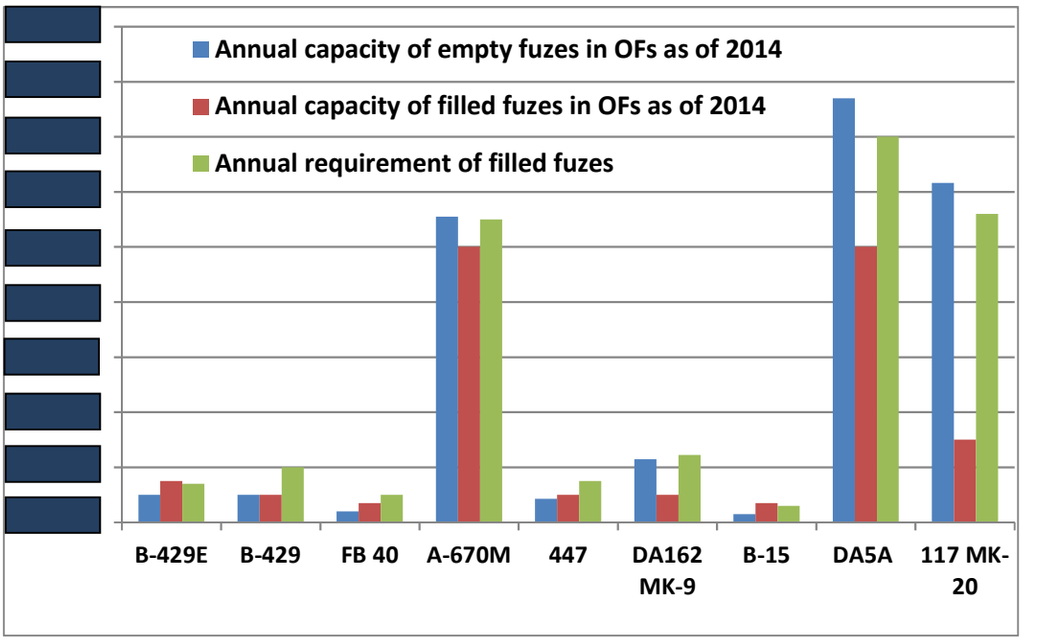
Table-12: Details of annual requirement of empty& filled (2014-19) fuzes *vis-à-vis* their available capacity (2014)

Fuze	Empty Fuze				Filled fuzes		
	Requirement	Production capacity	Supply plan from trade	Required capacity augmentation/ creation	Requirement	Production Capacity	Required capacity augmentation/ creation
B-429E	[redacted]	[redacted]	[redacted]	27,000	[redacted]	[redacted]	0
B-429	[redacted]	[redacted]	[redacted]	60,000	[redacted]	[redacted]	50,000#
FB 40	[redacted]	[redacted]	[redacted]	35,000	[redacted]	[redacted]	15,000
A 670M	[redacted]	[redacted]	[redacted]	1,00,000	[redacted]	[redacted]	50,000
447	[redacted]	[redacted]	[redacted]	40,000	[redacted]	[redacted]	25,000
DA162 MK-9	[redacted]	[redacted]	[redacted]	20,000	[redacted]	[redacted]	72,000
B-15	[redacted]	[redacted]	[redacted]	18,000	[redacted]	[redacted]	0
DA5A	[redacted]	[redacted]	[redacted]	0	[redacted]	[redacted]	2,00,000
117 MK-20	[redacted]	[redacted]	[redacted]	0	[redacted]	[redacted]	4,10,000

#-Due to Quality problems of B-429 fuzes, production/issue of the fuze was held-up since 2013-14. This has been pointed out in paragraph 2.4.4 (a) of Audit Report No. 8 of 2018.

Comparison of existing production capacity of empty fuze and their filling capacity against Users' requirements is shown in the **Chart-11** below:

Chart-11: Diagrammatic presentation of production capacity of fuzes against their requirement



It could be seen from the above that:

(a) There were mismatch in the availability of empty fuzes and their filling capacity. In respect of three fuzes *i.e.* A 670M, DA5A and 117 MK-20 there were adequate availability of empty fuzes from in house production and trade sources. However, their filling capacity at ordnance factories was less. For two types of fuzes *viz.* B-429E and B-15, though there were no constraints in filling capacity, production capacity for empty fuzes were inadequate. Mismatch in availability of empty fuze and their filling capacity was one of the contributing factors for shortfall in issue of related ammunition/spare fuzes to the Users against the assigned targets as discussed in **Paragraph 2.2.3.**

(b) Production capacity of seven types of empty fuzes was required to be augmented. However, Audit noted that OFB augmented (2014-15) the capacity of only B-429E to 77,000 fuzes per annum as planned and that of B-429 to 70,000 against requirement of 'T' lakh. Further, OFB sanctioned (July 2015) one project (₹10.17 crore) for capacity augmentation of FB-40 from 20,000 to 50,000 numbers *per annum* at MTPF. The planned date of completion (PDC) was September 2017. MTPF was yet to complete the project as of March 2019. Reasons for delay included delayed placement[18]/non-placement of orders for plant

[18] MTPF placed orders between November 2015 and March 2018 for 24 machineries out of 26 required and status of orders for remaining two machines were still under deliberation/evaluation by TPC/TEC.

and machinery, non-receipt of two machines (PDC September 2018) and delayed order (May 2018) for civil works with PDC of December 2018. For balance four empty fuzes (A670M, 447, DA162 MK-9 and B-15), the required capacity augmentation was yet to be done (March 2018).

(c) Similarly, filling capacity of seven types of fuzes was required to be enhanced. However, OFs increased the capacity (January/May 2018) only for three fuze items *viz*. DA5A, 117 MK-20 and B-429 to 7 lakh, 3.5 lakh and 60 thousand respectively. Thus, filling capacity was enhanced as per requirement in case of only one fuze.

OFB stated (March 2019) that for capacity augmentation of empty Fuzes B-429, A-670M and B-15, various machines were being procured at OFAJ and GSF. No capacity augmentation was required for Fuze 162 MK-8 and MK-9 having combined capacity of 1.5 lakh at GSF and availability of empty fuzes from established trade sources. Regarding empty Fuze 447, OFB stated in the Exit Conference that no in-house capacity was created due to adequate trade sources.

OFB's reply is not acceptable on the following grounds:

- Belated capacity augmentation of empty Fuze A-670M and B-15 was not in tandem with the Army's order pattern of related ammunitions. Resultantly, it affected the fulfilment of production target of fuzes (shortfall of 51 to 63 *per cent* for A-670M and 27 to 70 *per cent* for B-15) as well as shortfall in issue of the related ammunitions; and

- Reply of OFB is silent on the required augmentation of filling capacity of Fuze 162 MK-9 and 447 which resulted in shortfall in issue of related ammunitions 120mm HE/PWP (24 - 50 *per cent*) and 84mm HE (14 - 85 *per cent*).

2.2.2 Frequent revision of production targets

Based on the indents of the Users and the production capacity, OFB issues the annual production targets for the concerned factories. Audit noticed frequent mid-year revision of targets in respect of 15 ammunitions and eight spare filled fuzes.

During 2013-14 to 2017-18, in 83 instances, revision in production target was done on the request of Users mainly due to their re-prioritisation of certain ammunition/fuze items, budgetary constraints and allocation of fresh targets/increase in targets. However, in 117 instances, OFB itself revised the targets either on request of the filling factories or due to various production constraints. The trend of revision was erratic as the targets were increased or

decreased several times in the same year for the same ammunition/fuze. In 49 cases, final targets were more than the initial targets and in 32 cases, they were lower than the initial targets. Out of these 49 cases, in 19 cases, even the original targets which were less than the revised targets, were not achieved. As regards 32 cases of downward revision, the factories failed to achieve even the final target in 22 cases. Downward revisions of targets by OFs owing to their production bottlenecks resulted in regular shortfall in meeting the Users' requirement of the selected ammunition/spare filled fuzes as discussed in the succeeding Paragraphs.

OFB accepted the audit findings and stated (March 2019) that the revisions of targets were done under various circumstances. These included urgent requirement, variation in initial projection *vis-a-vis* budget allotment, revised requirements received mid-year from the Users, *etc*. However, fluctuation in targets/requirements of various ammunition items hampered the production planning.

All the above reasons cited by the OFB were attributable where Users requested for revision in production targets. The reply of OFB, however, was silent on the revision in production targets owing to their own constraints such as timely availability of input materials, quality issues in fuzes, *etc.* which are discussed in **Paragraph 2.3 and 2.4.**

2.2.3 Shortfall of production against targets

Audit examined the details of year-wise target, issue and quantity of shortfall in issue of 12 empty fuzes[19] to the filling factories. Audit noticed that there were shortfalls[20] in issue of 7 to 9 items each year to the filling factories[21] as given in **Table-13** below:

Table-13: Summary of shortfall against targets

Year	Number of items analysed in Audit	Number of items where shortfall existed	Number of items			
			Range of percentage of shortfall			
			1 to 20	21 to 50	51 to 80	81 to 100
2013-14	10	8	4	2	1	1
2014-15	11	9	4	1	2	2
2015-16	10	7	2	3	1	1
2016-17	12	9	1	2	3	3
2017-18	12	9	1	3	3	2
Total	**55**	**42**	**12**	**11**	**10**	**9**

[19] Empty Fuze-447, 213 MK-5 M-2 and B-25 planned to be procured from trade because of no in-house production capacity
[20] Shortfall was calculated w.r.t. initial target fixed by OFB or subsequent revised target at the instance of the Users', wherever applicable
[21] OF Chanda, OF Badmal, AF Kirkee & OF Khamaria

As could be seen from the above, the empty fuze manufacturing factories achieved the production target only in 13 out of 55 instances.

Audit further examined the details of ammunition along with filled fuzes issued to the Users in the five years (2013-18) *vis-a-vis* their annual production target. There were slippages mainly in issue of 8 ammunition items. One of the major reasons for slippages was short supply of related empty fuze by the concerned factories. Linkages of short supply in empty fuzes with slippages in issue of ammunition are indicated in **Table-14** below:

Table-14: Correlation between shortfall of empty fuze and that of linked ammunition

Name of Fuze (Factory)	Range (%) and period (years) of shortfall in supply of empty fuze	Name of linked ammunition (Factory)	Range (%) and period (years) of shortfall in supply of ammunition	Reasons for shortfall in empty fuze
A-670M (GSF, OFK, OFAJ)	51 – 63 (2013-18)	30mm HE/I & T (OFK, OFBL)	56- 89 (2013-18)	quality problems of critical components, heavy rejection, delay in proof
B-429 (OFAJ)	87 – 100 (2013-18)	130mm FVC/RVC (OFBL, OFCH)	21 (2013-14)	quality problems, dispute in proof methodology, stoppage of production Ammunition were issued with fuze only in 2013-14, in other years ammunition were issued without fuze.
FB-40 (MTPF)	42 – 79 (2013-14, 2016-18)	40mm PFFC (OFK)	33 - 59 (2013-14, 2016-18)	non-absorption of full ToT leading to dependence on OEM for product support, non-availability of a component (Capacitor)
162 MK-9 (OFAJ, GSF, OFDC)	31 & 58 (2016-18)	120mm HE & PWP (OFCH, AFK)	24 - 50 (2013-18)	substantial RFR and delay in proof. Shortfall in ammunition in other 3 years (2013-16) was due to short supply of empty bomb body/shell also.
B-15 (GSF)	27 – 70 (2013-14, 2015-18)	125mm HEAT (OFCH)	28 - 90 (2013-14, 2015-18)	rejection, delay in proof, limited trade source/delay in supply of critical components

Name of Fuze (Factory)	Range (%) and period (years) of shortfall in supply of empty fuze	Name of linked ammunition (Factory)	Range (%) and period (years) of shortfall in supply of ammunition	Reasons for shortfall in empty fuze
Fuze-104 (OFK)	9 - 50 (2015-18)	40mm L-70 HE/I (OFK)	16 - 66 (2013-18)	delay in proof/reproof. Shortfall in ammunition in 2013-15 was due to insufficiency of components including empty fuze ex-trade and non-allotment of target for empty fuze by OFB in 2013-14.
B-429E (OFAJ)	10 - 86 (2014-15, 2016-18)	125mm HE (OFCH, OFBL)	42 - 100 (2013-15, 2016-18)	delay in proof was the main reason for empty fuze shortfall. Shortfall in ammunition in one year (2013-14) was due to short supply of Semi Combustible Cartridge Cases (SCCC) by OFCH
DA5A (GSF)	21 - 46 (2015-18)	51mm HE (AFK, OFBL)	54 & 87 (2016-18)	shortfalls in empty fuze were due to heavy RFR and delay in proof.

It could be seen from the above Table that reasons for shortfall in manufacture and issue of empty fuzes mainly were-

- ✓ limited trade source of critical components,
- ✓ delayed delivery of components by vendors,
- ✓ continued dependence on product support from OEM,
- ✓ quality problems of critical components leading to its heavy rejection,
- ✓ delay in proof and re-proof due to rejection, non-resolving the issue of proof methodology, *etc.*

Shortfall in production and issue of filled fuzes along with ammunition by OFB led to non-fulfilment of indents of Users. As a result, there were critical deficiency in seven types of ammunition (31 March 2018) at the User's stock which ranged between 32 and 74 *per cent*.

2.2.3.1 Short supply of spare filled fuzes

Shelf life of fuze (5 to 10 years) is less than that of the related ammunition (7 to 30 years). Hence, in order to exploit the full life of ammunition, it is necessary to have spare filled fuzes in addition to the filled fuzes fitted with the ammunition.

User placed indents on OFB for 8 types of spare fuze. Audit, however, noted that short supply of empty fuzes not only affected the issue of ammunition but also led to less issue of spare filled fuzes to Users against targets. The shortfall in issue of 7 types[22] of spare fuzes ranged from 22 to 100 *per cent* in 25 out of 29 instances[23]. Substantial slippages in issue (40 *per cent* and above) occurred in respect of Fuze DA5A, 117 MK-20, B429E, B429 and DA162 MK-8. This resulted in critical deficiency in the stock of spare fuzes with Army ranging from 41 to 94 *per cent.*

Audit further noted (July 2018) that Army had stock of 'P' lakh ammunitions[24] worth ₹403.27 crore lying in unusable condition for want of spare filled fuzes.

OFB accepted the audit findings and stated (March 2019) that:

- In view of intricate components, involving stringent quality checks of fuzes compounded by scarcity of established suppliers resulted in gap between the requirement and receipt of empty fuzes. They added that considerable efforts were undertaken to develop new trade sources; and
- Delay in proof firing due to unavailability of components required for proof firing by DGQA resulted in short supply of Fuze B-15 in 2017-18. In several cases, proof ranges were not adequately equipped to carry out proof firings timely as per requirements projected in the ToT documents and unable to evaluate correctly the functioning of fuzes. The dispute between factory and quality assurance agency relating to proof methodology was another reason for delayed proof affecting issue of the ammunition to the consignee.

Deficiency in availability of components/input materials and quality problems are discussed in details in **Paragraphs 2.3 and 2.4**.

Regarding deficiency in stock of Army, OFB stated that despite deficiency of 1.20 lakh 40mm PFFC ammunition with Army (March 2018), OFB received targets of only 15000 and 8000 for 2018-19 and 2019-20 respectively against capacity of 50000. Army never placed indent for its spare fuze *i.e*. Fuze FB-40 despite deficiency in their stock.

OFB's reply is not acceptable as it had annual production capacity of 35,000 only. The reply is also silent on the supply of the 40mm PFFC ammunition in the period 2013-18 in which it supplied only 68 *per cent* of total targets of ammunition.

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[22] DA5A, 162 Mk8, 117 Mk20, 162 Mk-9, B429E, B429, 213 Mk-5 M-2; for Fuze FMC, 11 and 17% shortfall noticed in 2 years.
[23] Production target not allotted for 1 year, 2 years and 3 years in respect of fuze 162 Mk-8, 162 Mk-9 and 213 Mk-5 M2 respectively.
[24] 51mm HE, 81mm Smoke and 130mm FVC/RVC

2.3 Procurement of input material/components/Fuzes

2.3.1 Limited vendor base

Open Tender Enquiry (OTE) is resorted to for procuring input materials. Source Development OTE (SD OTE) is also issued for developing new sources, wherein the already established sources for a particular item are not eligible to participate. In case of urgency, Limited Tender Enquiry (LTE) can be resorted to. The General Financial Rules (GFR) stipulates participation of more than three vendors in LTE. Single Tender Enquiry (STE) is resorted to for procurement from a firm being the only manufacturer or purchase from a particular source in emergency. For source development in respect of 'made to order' items, 50 *per cent* of the total requirement must be procured through OTE. The Ministry directed (March 2005) Ordnance Factories (OFs) to undertake vendor development and capacity verification of vendors supplying input materials to the OFs.

Audit analysed orders placed through SD OTE *vis-à-vis* those through STE/LTE/OTE for input materials by the empty fuze manufacturing factories during 2013-14 to 2017-18. It revealed that out of 364 TEs, only 8 *per cent* SD OTEs and 4 *per cent* normal OTEs were issued. For filling factories, the extent of SD OTEs and normal OTEs was 13 and 8 *per cent* respectively out of 202 TEs. Not a single SD OTE was issued by GSF and AFK. On the contrary, the empty fuze factories and filling factories resorted to LTEs to the maximum extent of 77 and 75 *per cent* respectively because of availability of limited number of vendors. This indicates that adequate efforts for source development through SD OTE were not taken by OFs.

Audit examined availability of vendors for 50 selected input materials at four[25] empty fuze manufacturing factories. Audit noticed that no vendor was available for 3 items[26] (OFAJ), one to three vendors were for 34 items and more than three vendors were for 13 items only. Limited vendor base (up to three vendors) was predominant in respect of Fuze A-670M (for 7 of 10 items), 162 MK-8 & 9 (for 7 of 9 items), B-15 (all 6 items), 64-C (all 4 items) and B-429/B-429E (4 of 7 items). Similarly, examination of 43 selected materials at five[27] filling factories revealed that no vendor was available for 5 items[28] (AFK). One to three vendors were available for 23 items and more than three vendors available only for 12 items. Vendor base was very limited for input materials of filled Fuze 117 MK-20, 162 MK-9, B-15 and FMC.

[25] OFAJ, GSF, MTPF, OFK
[26] Brass Rod for Fuze A-670M, CD Steel Rod 30mm Dia for Fuze B-429E & Safety Cap for Fuze B-429E
[27] AFK, OFK, OFCH, OFDR, OFBL
[28] Empty Fuze DA 162 MK-9 Brass with Cap, Composition Exploding Crystalline, Tetrazene, Composition RD 1337 and Lead Azide 2236ME.

OFB stated (March 2019) that considerable efforts were undertaken to develop adequate new sources by floating OTE and SD OTE. For empty Fuze 162 MK-8 and 117 DA MK-20, number of established vendors were 6 and 14 respectively. Regarding empty Fuze A-670M, OFB stated that the fuze was very complex in nature and firms were facing difficulties to develop it.

OFB's reply has not addressed the main audit findings on inadequate vendor base for critical input material/components of empty as well as filled fuzes. Reasons for not issuing OTE and SD OTE on majority of the cases were also not provided to Audit.

2.3.2 Timeliness in procurement of stores

In order to accomplish the annual production targets allotted by OFB to the OFs, input materials are required to be procured on time. Accordingly, a time limit of two weeks is prescribed for issue of Tender Enquiry (TE) after preparation of the Store Holders' Inability Sheets (SHIS)[29]. For procurement cases within the power of General Manager of factory, maximum 15 weeks (105 days) for LTE and 19 weeks (133 days) for OTE are provided[30] to complete the procurement process[31].

Audit examined time taken in issue of TE and placement of orders for procurement of materials/components[32] for selected fuze items during 2013-14 to 2017-18. The results are summarised below:

- In the empty manufacturing factories, out of 172 TEs examined, only 29 TEs were issued within one month after preparation of SHIS. The OFs took 1 to 24 months in issuing 143 TEs (83 *per cent*). The OFs placed only 79 supply orders within prescribed time of 19 weeks and took more than five months and up to 26 months in placing 101 orders (56 *per cent*) worth ₹20 crore. Delayed placement of orders was predominant in three factories *viz.* MTPF (63 *per cent*), OFAJ (62 *per cent*) and GSF (40 *per cent*).
- As regards filling factories, four OFs[33] (OFCH, OFK, AFK, OFBL) took one to 19 months in issuing 66 out of 86 TEs examined. Supply orders were placed in time in only 78 (53 *per cent*) of 148 cases examined in four factories. The value of the 70 orders placed with delays were ₹92.60 crore. Audit noticed substantial delays in placement of orders at OFBL (100 *per cent*) and OFCH (93 *per cent*). The factories took five to 43 months' time in placing orders after preparation of SHIS.

[29]SHIS indicates total requirement, present stock and dues, net requirement, *etc.*
[30] For purchase under single commercial bid
[31]Starting from generation of SHIS to placement of the orders on the selected firms
[32]Empty fuzes: 50 items, filled fuzes: 43 items.
[33]At OFDR, no TE issued and SO placed.

Inordinate delays in issue of TE, its evaluation and placement of orders on the suppliers by the OFs led to delayed/non-positioning of input materials. It adversely affected the achievement of production targets resulting in shortfall in issue of empty fuzes to the filling factories and also in issue of spare filled fuzes.

OFB accepted the facts and stated (March 2019) that main reasons for the delays in procurement of stores were as under:

- involvement of various agencies,
- addressing technical clarifications from the vendors,
- non-availability of bid from bidders,
- capacity verification of firms,
- delayed vetting of SHIS/Material Planning Sheets by Accounts Office,
- fluctuation of targets,
- post tender negotiations, *etc*.

It added that actionable monitoring system was instituted by OFBL to reduce delay at various stages.

Audit is of the view that the above factors adduced by OFB were controllable and the stipulated time was fixed after considering all these practical constraints. Hence, the stipulated timeline for issue of TEs and placement of orders should have been adhered to.

2.3.3 Delays in receipt and inspection of input materials

Timely receipt of input materials from the vendors as per delivery period (DP) stipulated in the supply order is an important pre-requisite for accomplishing the production target.

Audit, however, noticed that delayed delivery of input materials by the suppliers was one of the contributing factors leading to delay/shortfall in issue of ammunition/spare filled fuzes to the Users as discussed in **Paragraph 2.2.3**. Details of delayed receipt of input materials against 115 orders valuing ₹322 crore in the empty fuze manufacturing and filling factories are shown in **Table-15** below:

Table-15: Delay in receipt of input materials

Factory	No. of Supply Orders (SOs) examined	Total value of SOs examined (₹ in crore)	No. of SOs with delayed/ non-receipt	Value of SOs with delayed/ non-receipt (₹ in crore)	Period of maximum delays (in days)
GSF	59	3.99	34	2.58	2774
OFAJ	20	3.55	15	3.19	681
Total (Empty Fuze factories)	**79**	**7.54**	**49**	**5.77**	**2774**
OFK	26	264.76	20	240.53	510
OFCH	19	8.41	2	3.58	89
OFBL	33	82.03	15	43.23	1733
AFK	137	156.92	29	28.66	639 (not received till 31.03.2018)
Total (filling factories)	**215**	**512.12**	**66**	**316.00**	**1733**

It is seen from the above that empty fuze manufacturing factories could not receive complete ordered quantity of the material within the stipulated delivery period in 49 out of 79 cases. For 19 orders, 'no' material was received within scheduled delivery period.

The maximum period of delay in receipt of the input materials was 2774 days at GSF and 681 days at OFAJ. Audit noticed that delays in receipt of input materials were mostly in case of Fuze A-670M, B-15, 162 MK-8 & 9, FMC and DA-5A. OFs recovered liquidated damages (₹22.46 lakh) in respect of 41 orders for delayed delivery by the suppliers.

Similarly, for filling factories, in 149 out of 215 orders examined, 100 *per cent* materials were received within original DP. In 22 out of balance 66 cases, 'no' material was received within the stipulated DP. Maximum delay of 1733 days was found at OFBL. Three OFs (OFCH, OFBL and OFK) recovered ₹144.12 lakh from the suppliers as liquidated damages for delayed delivery in respect of only 20 orders. Audit noticed maximum instances of delays in receipt of input materials for filled Fuze A-670M, DA-117 MK-20, DA-5A and FFV-447.

Audit also noticed substantial delays in inspection of input materials received by the factories as discussed below:

OFB's Standard Operating Procedure (SOP) stipulates that all materials are required to be inspected within 15 days of receipt in the Factory for acceptance.

Audit analysed 1606 Material Inward Slip (MIS)[34] of 46 selected input materials for empty fuzes at OFAJ, GSF and MTPF for 2013-14 to 2017-18. It revealed that only in 340 instances (21 *per cent*), the factories completed inspection within 15 days. In 1266 MIS (79 *per cent*) valuing ₹41.57 crore, the factories took more than 15 days and up to 264 days (GSF) for inspection. As regards four filling factories, clearance of 2538 MIS (73 *per cent*) worth ₹717 crore took more than stipulated 15 days and up to 389 days.

Main reasons of abnormal delay in clearance of MIS to receipt vouchers at GSF, OFK and OFBL were:

- Abnormal time taken in inspection by both QC section of the factories as well as attached SQAE;
- Late preparation of receipt vouchers by the OFs even after inspection; and
- Inordinate delays in clearance of bulk lot despite clearance of sample lots.

OFB accepted the facts and stated (March 2019) that the delay was due to stringent quality checks required for intricate components of fuze jointly by SQAE and factory and release of QAC by SQAE. It added that the timeline of 15 days might not be feasible for empty Fuze B-15 which requires multifaceted test facilities for intricate and multi-technology components. However, OFs had since taken efforts to complete the process within reasonable time by regular follow-up with sister factories, trade firms and other inspection/outside testing agencies.

OFB's reply is silent about reasons for delayed receipt of input materials from trade firms. Regarding inspection of input materials/components and preparation of receipt vouchers, OFB itself stipulated the time period of 15 days and, hence, OFs should have adhered to the timeline. However, considering practical requirement, OFB may review the inspection time and customise the timeline in respect of few specific items.

2.3.4 Trade procurement and import of empty/filled fuzes

Audit noticed that failure of the empty fuze manufacturing and filling factories to produce required quantum of quality fuzes resulted in dependence on trade firm/import for both empty and filled fuzes.

As per procurement planning of OFB, the filling factories need to procure only three empty fuze (447, 117 MK-20 and 213 MK-5 M-2) from trade due to non-

[34] MIS records date/quantity of physical receipt of materials in the Factory for each consignment

availability of in-house production facilities. Total value of procurement of these fuzes during 2013-14 to 2017-18 were ₹221 crore.

However, three filling factories (OFBL, OFK and AFK) procured other four[35] types of empty fuzes ('U' lakh valuing ₹132 crore) during 2013-14 to 2017-18 either due to capacity constraints or short supply of empty fuzes by the feeder factories.

Further, the filling factories (OFCH and OFK) also procured 'V' lakh numbers of filled fuzes (A-670M, FB-40 and B-15) worth ₹238.63 crore[36] through trade/ import during 2013-14 to 2017-18. The procurement of filled fuzes through trade/import were mainly due to short supply of empty fuze by the concerned factories and significant rejection of filled fuzes in quality inspections.

OFB accepted the facts and stated (March 2019) that empty Fuze DA5A and A-670M were procured through trade as the concerned factories could not meet the total requirement. Import of filled Fuze B-15 was due to capacity constraints at GSF.

2.4 Quality Conformance during and after Production

The Quality checks in the production are the joint responsibility of the Ordnance Factories and the DGQA or its counterparts in Air Force and Navy. Audit observed many deficiencies in Quality checks being performed by the Factories as well as the final quality and proof tests being carried out by the SQAE. These findings are as follows.

2.4.1 Inadequate quality checks by factory QC and SQAE

Examination of the records of QC/QA checks at GSF, OFBL and the SQAEs revealed inadequate compliance with the prescribed quantum of checks in respect of seven[37] empty fuzes and two[38] filled fuzes as under:

- Instead of 100 *per cent* gauging and visual checks and other critical prescribed tests at various stages of the manufacturing process, QC section of the OFs carried out sample inspection. In certain cases, QC section had not maintained register in support of the sample checked. Instead Junior Works Manager of concerned QC section issued certificates.

[35]Fuze A-670M, DA5A, 162 MK-8 & 64C
[36]Of these, two import orders worth ₹35.19 crore for import of 381957 nos. of filled Fuze A-670M were not accepted by the foreign firm.
[37]A-670M, DA5A, FMC, 64C, 162 MK-8 and 9, B-15 (DD & PG).
[38]A-670M and 162 MK-8.

- As regards QA checks, SQAE did not maintain any record of individual check of sample quantity. SQAEs had not done certain checks *e.g.* loose wind shield and lot marking for empty Fuze DA5A, check of length and width of trigger of FMC, *etc*.

OFB stated (March 2019) that GSF conducted 100 *per cent* gauging and visual checks of empty Fuze A-670M. Similarly, for Fuze B-15, 100 *per cent* checks for load test of slider and spring contactor, and visual checking of contactor after surface treatment were done.

OFB's claim of 100 *per cent* QC checks[39] of various parameters for Fuze A-670M and B-15 is not acceptable as the relevant records showed evidence of only sample checks. No record showing 100 *per cent* QC checks was made available to Audit.

The above mentioned deficiencies in checks by QC section of OFs and QA checks by respective SQAEs resulted in RFR/rejection of the fuzes which are discussed below.

2.4.2 Trends in RFR and Rejection of fuzes

QC inspection either clears the items for onward inspection by QA agency or returns the items for rectification which is termed as 'Returned for Rectification' (RFR). There is no norm for acceptable level of RFR for a particular product. Ministry, however, ordered (October 2008) that one of the main objectives of upgrading the quality management was to eliminate RFR. Further, QA agency (SQAE) has either to accept or reject finished items. There is no provision for QA agency to return any item inspected by them for rectification (RFR). For final rejection by the SQAE, there are permissible (unavoidable) rejection limit prescribed for each fuze item.

Audit, however, noticed that QA establishments were also returning finished fuzes to the production shop for rectification.

(a) Empty Fuze

The trend of RFR and rejection, during 2013-14 to 2017-18, of empty fuzes having significant shortfalls in production is shown in **Table-16** below.

[39] Sample test for Spin of Safety Lock mechanism and 100% Load test prescribed for filled Fuze A-670M (OFBL) but no record found in support of actual test done

Table-16: Trend of RFR and rejection of empty fuzes

Name of Fuze	Empty Fuze Manufacturing Factory	Range of Percentage of RFR	Range of Percentage of Rejection
A-670M	GSF, OFK, OFAJ	10 – 30	12 – 41
B-429	OFAJ	11	80
FB-40	MTPF	Nil	5 – 9
162 MK-9	OFAJ, GSF, OFDC	21 – 50	2 & 5
B-15 (a) Detonating Device (b) Piezo Generator	GSF	 17 – 100 33 & 70	 16 – 28 17 – 28
Fuze-104	OFK	2 – 7	2 – 9
B-429E	OFAJ	8	Nil
DA5A	GSF	3 – 82	4

Thus, substantial RFR/ rejection was the dominant reason for short supply of empty fuzes (A-670M, B-429, 162 Mk-9, B-15 and DA5A). RFR/rejection of one fuze item *viz.* FB-40 was comparatively lower. However, non-absorption of full ToT leading to continued dependence on OEM for product support and non-availability of one component (Capacitor) led to shortfall in production of FB-40. Further, in case of Fuze-104 and B-429E, despite lower percentage of RFR and rejection, there were shortfalls in production primarily due to delay in proof/reproof.

Audit noted that the main reasons for RFR of empty fuzes were dimensional deviation, defective components/assemblies and their non-functioning. Some RFRs were also due to dent mark, improper cleaning/ stamping, *etc*. Further, empty fuzes were rejected primarily due to premature functioning and defective components.

(b) Filled Fuze

Audit analysis of results of final acceptance inspection and proof of the selected fuzes by SQAEs during 2013-14 to 2017-18 revealed substantial rejection of filled fuzes as shown in **Table-17** below:

Table-17: Trend of RFR and rejection of filled fuzes

Name of Fuze	Fuze Filling Factory	Range of Percentage of RFR	Range of Percentage of Rejection
A-670M	OFK	4	2 – 12
B-429	OFCH	No Production	No Production
FB-40	OFCH	1	36
162 MK-9	OFCH, AFK	1	2

Name of Fuze	Fuze Filling Factory	Range of Percentage of RFR	Range of Percentage of Rejection
B-15	OFCH	1 – 2	12 – 43
Fuze-104	OFK	2 – 7	2 – 5
B-429E	OFCH, OFBL	Nil	Nil
DA5A	AFK, OFBL	1	3 – 8

Audit noticed that reasons for RFR/rejection of filled fuzes were similar to those of empty fuzes such as dimensional deviation, improper stamping/clean, blinds, premature functioning, *etc.* Total value of rejection of selected empty and filled fuzes worked out to ₹157 crore.

OFB stated (March 2019) that:

- Factory QC, after 100 *per cent* inspection, offered batch-wise quantities to SQAE. In certain cases, SQAE also declared RFR and in many cases, the recurrences of RFR by SQAE were due to differences in opinion/view between QC and SQAE.
- After implementation of Pilot project[40] (September 2016) based on Raman Puri Committee recommendations, RFR of empty Fuze A-670M at OFAJ was 2.7 *per cent* during April 2016 to November 2018 indicating decreasing trend.
- Based on recommendation of Joint Investigation Committee, the quality problems of empty Fuze A-670M were resolved (2015-16). After that, around 3 lakh fuzes were successfully proof fired and issued to consignee till date.
- For B-429, the proof methodology in alignment with ToT proof schedule was finalised (October 2018).Validation trial of one lot was carried out (December 2018) and was found satisfactory.

The replies of OFB confirm the audit observation on unauthorised RFR being done by QA agency. Recurrent RFR of filled fuzes on the same grounds delayed their supplies as rectification involved extra time and manpower. OFB's reply on resolving quality problems of fuze A-670M in 2015-16 is not acceptable as there were rejection of 17 and 12 *per cent* in 2016-17 and 2017-18 respectively.

2.4.3 Delays in conducting proof trials

Proof test is used to check fitness of the fuze for use by subjecting the same to deliberately intense testing/firing beyond normal operational capacity. Proof testing of empty and filled fuzes received from OFs is conducted in Central Proof

[40]control point and surveillance point inspection in manufacturing process being the complete responsibility of factory and DGQA being responsible for only the Final Acceptance Inspection.

Establishment (CPE) Itarsi and Long Proof Range (LPR) Khamaria under DGQA and Proof and Experimental Establishment (PXE) Balasore under DRDO. The Ministry had directed (October 2008) DGQA to work out a time bound plan for proof testing, in consultation with the OFB and User.

However, DGQA/Ministry had not fixed any time limit for proof activities as of March 2018. Data analysis of 10 empty fuzes showed that in 42 *per cent* of the instances (2013-18), the proof trials took even up to 760 days. Audit noticed substantial delays for five fuzes *viz.* 162 MK-8, A-670M, 162 MK-9, B-15 and FMC.

The data analysis for 10 filled fuze items revealed that the proof agencies took more than 10 days' time in eight *per cent* cases test-checked. Audit noticed maximum delays for Fuze DA5A and FB 40.

SQAE(A), Khamaria attributed (May 2018) the delays in proof trials to non-availability of target plate/proof stock components, required testing machine under repair, bad weather conditions, lack of co-ordination between the representatives of concerned OFs, re-proof of failed lots, *etc*.

SQAE(A), Khamaria, stated (June 2018) that no time limit could be set for proof trial due to various activities *viz.* drawing of sample and its despatch to LPR, checking of documents, coordinating inputs of various sections of LPR, checking of parameters, *etc.*

The reply of the SQAE(A) is not tenable as OFB while issuing production order to OFs forwards copy to the CQA(A) concerned. CQA(A) notifies the concerned Proof Establishments for timely provisions of stores and capacity for the proof activities.

OFB accepted the facts and stated (March 2019) that both the proof ranges (LPR Khamaria and CPE Itarsi) function under DGQA and delayed proof trials were due to the following factors:

- Unplanned Joint Receipt Inspection and proof of imported ammunition causing shortage of proof stock components/ target plates;
- Frequent breakdown of old vintage weapons during proof and non-availability of weapon/equipment required for proof; and
- Conduct of so many firings for different OFs and Depots, check proof for imported items, investigational firing and trials.

During Exit Conference Chairman, OFB attributed the delays mainly to lapses in proof planning by all the involved agencies.

Audit is of the view that DGQA, in consultation with the OFB and Users, should make a timeframe for conduct of proof testing of OFB products. Proof methodology may also be streamlined in line with ToT to obviate the subjectivity in the existing practice.

It is recommended that MoD/OFB should look into alternatives to conducting live firing/testing as proof trials for clearance of lots of empty and filled fuzes.

2.4.4 Joint Investigation of rejected fuzes

OFB's Procedure Manual stipulates that all substantial rejections of finished products before issue to the Users should be subjected to a separate or Joint Investigation (JI) by Production and Inspection Groups. It also prescribes for urgent remedial measures to avoid recurrence of such rejections. Further, DGQA Standing Orders also stipulate that the cases of heavy rejections and their causes are to be immediately reported to CQA and HQ DGQA by the SAQE concerned. However, no timeline has been prescribed by the DGQA for completion of JI.

Audit analysis of JI of rejections of 63 lots (2013-18) of empty fuzes (six[41] types) at GSF, OFAJ and OFK revealed that:

- JI was constituted for 51 lots[42] and completion of the JI took 4 to 54 months. Maximum delays occurred at OFAJ.

- Outcome of JI reports for six rejected lots (Fuze 162 MK-9, B-15 & A-670M) at GSF could not be ascertained due to non-furnishing of the JI reports to Audit by SQAE.

- At OFAJ, even after completion of the JI of 30 lots, approval of fresh proof/trial was awaited from the CQA(A) as of March 2018.

- Audit noticed inconclusive JI report of three rejected empty lots of Fuze A-670M at OFK. For 11 other rejected lots (Fuze 104 and A-670M), the causes of rejections were identified and fresh proof were recommended[43] after replacement of defective components.

In case of rejection of 135 lots of filled fuzes, JI was done for only 43 lots and out of these 43 JIs, only 13 had been completed. The JI identified the probable cause of failure only for three lots. Of the balance 92 lots, no JI was required for 18 lots as the rejected fuzes were procured from trade.

[41]Fuze 162 MK-8, 162 MK-9, B-15, A-670M, B-429 & 104
[42]JI for 12 lots was yet to commence at OFK even after lapse of 1 to 33 months after rejection.
[43]No fresh proof recommended for one lot of Fuze 104 due to critical defect (failure in safety)

OFCH and attached SQAE(A) attributed delayed completion/non-completion of the JI to delays in CQA(A)'s approval of commencement of JI, deputing SQAE's representative and involvement of multiple agencies for various analysis. There were delays in approval of the JI report by CQA(A) also.

SQAE(A), Khamaria stated (June 2018) that investigation for identifying the cause of defect and suggesting remedial measures were continuously monitored resulting in downward trend of rejection.

OFB stated (March 2019) that:

- Investigation of rejected fuze lot was done immediately but sometimes delay occurred in processing the case through SQAE(A) and CQA(A) for approval. Finalising the investigation required considerable time as it involved breakdown of filled fuzes/components being a hazardous process; and
- Depicting the exact cause of failure, only from the hardware point of view, was very difficult as it was related to various aspects pertaining to explosive, ammunition and weapon.

The above replies of OFB are not acceptable as delays in investigation, inconclusive results in many cases and in some cases, delayed implementation of remedial measures led to rejection of subsequent lots on the same grounds. Further, SQAE's claim of downward trend of rejection is not convincing as Audit noticed that there was increase in rejection of empty fuze B-15 (16 to 25 *per cent*) in 2017-18 over the year 2016-17.

2.4.5 Functioning of Failure Review Board

In addition to the mechanism of JI, Failure Review Board (FRB) is to be constituted in each Factory under the chairmanship of General Manager to analyse all failures and initiate remedial measures. Findings of the FRB along with the recommendations are to be examined by CQA(A) for necessary action. FRB meeting is to be held every month followed by review of implementation of the recommendations in the subsequent meeting.

FRB meetings[44] were held only at OFAJ and OFK during 2013-18 in respect of five empty fuzes. Audit analysis of minutes of the meetings revealed that out of 53 rejected lots (2013-18) subjected to FRB, five lots were declared serviceable, one lot finally rejected and five lots were under investigation as of March 2018. In case of remaining 42 lots, fresh proof based on FRB recommendations were yet to be carried out or final decision from CQA(A) was awaited.

[44]No FRB meeting held at MTPF and GSF for the selected fuze items during 2013-14 to 2017-18

Analysis of minutes of FRB meetings (2013-2018) in respect of 78 rejected filled fuze lots at OFCH, OFK and OFBL revealed that 60 lots were still under investigation for four months to four years. For 13 lots, fresh proof/final decision of CQA(A) was awaited. Three lots were declared serviceable and two lots were finally rejected. AFK had not constituted any FRB for two types of fuzes[45] rejected during 2013-18.

OFB stated that FRB was being conducted in every month under the chairmanship of GM with SQAEs and remedial measures were implemented. OFB's reply was not specific on the corrective measures required to curb the recurring delays in investigation and to draw conclusive recommendations by FRB.

2.4.6 Defect Investigation of accidents/failure at Users' end

On receipt of report on accident or failure of ammunition from Users, DGQA is to carry out defect investigation by a committee comprising representatives of OFs, DGQA and DRDO with the following objectives:

- To find out the exact/ probable cause of defect/ failure;
- To suggest remedial measures to overcome the defects;
- To obtain free replacement within the shelf life of ammunition; and
- To identify design changes/improvement and give feedback to OFs.

Investigation is required to be completed within 90 days and the report is to be finalised within total 210 days of receipt of defect report from Users.

Army and Navy reported 36 cases of accidents during 2013-14 to 2017-18 in respect of nine ammunition items related to the selected fuzes. The status of 18 accidents[46] relating to six ammunitions mainly because of fuze related defects/problems is summarised in **Table-18** below:

[45]Fuze 117 MK-20 & DA5A

[46]14 cases of DI revealed that accidents occurred due to problems of other components of ammunition also (shell, cartridge case, propellant). Final report was awaited for 2 of the 13 cases. No DI conducted in 4 cases.

Table-18: Details of accidents and status of investigations

Ammunition (related fuze)	Number of accident	Date of accident	Nature of accidents	Status of Defect Investigation (DI)
30mm HE/T (A670M)	1 (Army)	06.01.2016	Barrel burst and muzzle brake broken.	DI completed declaring the lot 'Unserviceable' due to defects in booster filling of fuze.
40mm L-70 HE/T (104)	2 (Army)	23.11.2014 02.02.2016	Accidental blast, cartridge case and round burst	DI completed. Explosive fillings of fuze and propellant not satisfactory and the lots declared 'Unserviceable'.
Bomb 51mm Mortar HE (DA5A)	1 (Army)	29.05.2014	Flight premature, short range (Army)	Army: DI completed. Primary and augmenting cartridge and fuze declared 'Unserviceable'.
Bomb 81mm Mortar HE (162 MK 8)	5 (Army)	12.04.2013 02.09.2014 13.09.2014 28.03.2014 08.09.2016	Premature function, blind, cracks in filling, short range	DI completed in all 5 cases declaring the ammunition lots 'Unserviceable' (fuze 'Unserviceable' in all 5 cases).
84mm Illuminating (64C)	2 (Army) 2 (Navy)	12.04.2016 24.04.2017 16.03.2015 12.03.2017	Blind Blind	Army: In one case, DI completed declaring the ammunition 'Unserviceable' (deviation in explosive filling of fuze). Another case closed without DI as suggested by Army. Navy: DI completed declaring the ammunition 'Unserviceable' mainly because of defective filling of fuze.
Shell 125mm HE (B-429E)	5 (Army)	04.08.2014 13.11.2014 14.08.2015 11.08.2015 08.10.2016	Barrel burst, Weapon damage	DI completed. Fuze lot declared 'Unserviceable' in 4 cases and recommended for early exploitation in one case.

Audit scrutiny of DI reports revealed that delay (174 to 664 days) in completion of DI was mainly due to non-availability of samples in time, delayed reporting of OFB's representatives at CQA(A) and delayed receipt of investigation reports from other units *viz*. CQA(ME) Kirkee, CPE Itarsi, SQAEs, *etc.*

Abnormal delay in completing defect investigations causes delay in taking remedial actions by the concerned OFs involved in manufacture of the fuze. Meanwhile, production of the fuze in OFs may continue which is fraught with the risk of carrying same defects.

OFB stated (March 2019) that one lot of 30mm HE/T was sentenced unserviceable by CQA(A) due to expiry of its shelf life. Regarding 40mm L-70 HE/T ammunition, investigation procedure adopted by CQA(A) was neither authenticated method nor suggested by the OEM[47]. However, OFK planned to upgrade this ammunition using new fuze (LI-473) and primer from OEM.

The reply is not acceptable as shelf life of the 30mm HE/T ammunition was extended by CQA(A) up to December 2018. The root cause of the accident was discrepancy in booster filling of the fuze. Regarding 40mm L-70 HE/T ammunition, CQA(A) is the final authority for defect investigation and representative of OFB was also part of the investigation team. OFB did not reply on the status of Defect Investigation in the other cases. Further, Audit is of the view that role and responsibility of SQAE/DGQA is not clear once the fuze/ammunition leads to accidents at the Users' end even after they were cleared by SQAE after detailed Quality Assurance and Proof firings. Ministry also needs to look into the responsibility of Quality Assurance agencies like CsQA, SQAEs, *etc*. in case of accidents.

2.5 Research and development projects for fuzes

2.5.1 Development of electronic fuzes

Western and European countries have been replacing mechanical fuzes with electronic fuzes due to their enhanced reliability, besides making it possible to incorporate various operating modes into a single multi-purpose design. Even our neighbouring countries have fully developed the electronic fuzes. In 1993, Indian Army also decided to shift from mechanical fuze to electronic fuze. Army started procurement of electronic fuze from Electronic Corporation of India Limited (ECIL) from 2000 onwards, since electronic fuzes were not in the product line of OFB. In March/April 2009, Army declared mechanical fuze as 'obsolescent' and its procurement from OFB was stopped. However, no alternative source development for electronic fuze was undertaken by MoD. In order to overcome the deficiency, DGQA further changed (May/June 2011) the status of mechanical fuzes from 'obsolescent' to 'current'.

In 2012, Army issued RFP for Artillery Gun fuze, in which vendors other than ECIL participated. Finally, order for 3,20,800 numbers of three types of fuzes was placed (August 2015) on Bharat Electronics Limited (BEL) with PDC as August 2017.

Audit noted that ECIL and BEL had technical collaboration with M/s Fuchs Electronics, RSA and M/s Reshef Technology Ltd., Israel respectively for

[47]Original Equipment Manufacturer: Bofors - Swedish Company

development and manufacture of the fuzes. However, ECIL could not indigenise[48] all the components. The import material content in electronic fuzes produced by ECIL was still around 60 *per cent* as of December 2017. Further, BEL achieved 50 *per cent* indigenisation as of August 2016 against scheduled timeframe for absorption of technology by January 2017.

During the period 2013-14 to 2017-18 Army placed five orders of 'S' lakh electronic fuzes valuing ₹ 1511 crore on ECIL and BEL for supply of eight types[49] of electronic fuzes for 105mm, 130mm and 155mm ammunition as depicted in **Table-19** below:

Table-19: Year-wise order and supply details of electronic fuzes

Date of order	Quantity ordered (versions)	Value (₹ in crore)	Source	Delivery by	Quantity supplied to Army			
					2014-15	2015-16	2016-17	2017-18
20.11.2014	[redacted]	380.01	ECIL	March 2017	-	[redacted]	[redacted]	0
18.11.2016	[redacted]	185.25	ECIL	March 2018	-	-	-	[redacted]
20.03.2017	[redacted]	448.91	ECIL	December 2018	-	-	-	0
19.06.2017	[redacted]	205.92	ECIL	April 2019	-	-	-	0
14.08.2015	[redacted]	291.05	BEL	August 2017	-	-	[redacted]	[redacted]
Total	**'S'**	**1511.14**			**'W'**			

Against total order of 'S' lakh fuzes during 2014-18, Army received 'W' lakh fuzes from ECIL and BEL as of December 2018 and that too, mostly with imported product supports.

Audit noted that BEL launched (October 2017) a state of the art electronic fuze manufacturing facility in collaboration with M/s Reshef Technologies, Israel for producing 50,000 fuzes per month. However, as of August 2019, BEL had supplied total 2.14 lakh fuzes against the deliverable quantity of 2.90 lakh.

This indicates that OFB and ECIL had inadequate capacity to meet the requirement of electronic fuzes projected by Army 25 years back (1993). BEL's efforts to augment its production capacity was yet to fulfil Army's requirement.

[48] Indigenisation being carried out in phased manner and no specific time frame indicated by ECIL

[49] Proximity M85P13A1, PD M85P13PD1, Time M85P13T1 for 105mm; Proximity M85P13A2, PD M85P13PD2 for 130mm and Proximity M85P13A3, PD M85P13PD3A, Time M85P13T3 for 155mm ammunition

Audit noticed that the Army, in its second Roll-on Indent (2014-19), indicated (July 2013) requirement of electronic fuzes for 105mm, 130mm and 155mm ammunition. Army further requested to OFB (May 2014) for requirement of another two types of electronic version against Fuze 213 MK-5 M-1 and M-2. However, OFB did not take any initiative till March 2018 to create in-house production capacity of these electronic fuzes[50]. Only in July 2017, OFB sanctioned an in-house R&D project for development of electronic point detonation fuze for artillery ammunition (130mm and 155mm) at MTPF at a cost of ₹ 12.96 crore with planned date of completion (PDC) by July 2018. However, as of May 2018, only field trial of pilot lot was conducted successfully at an expenditure of ₹2.54 crore.

OFB stated (March 2019) that though OFB was not mandated for production of electronic fuzes, certain in-house technology demonstration projects (R&D) were taken up for electronic fuze.

The reply is not acceptable as Army categorically indicated (July 2013) requirement of electronic fuzes for 105mm, 130mm and 155mm ammunition in its second Roll-on Indent (2014-19). Army also requested (May 2014) OFB for requirement of another two types of electronic Fuze (213 MK-5 M-1 and M-2). Further, there has to be no separate mandate for production of electronic fuzes by the OFB. As stated earlier, OFB is manufacturing one electronic fuze *viz*. FB-40 for 40 mm PFFC ammunition. Expecting a separate mandate from the MoD without even development of electronic fuzes is not clear to Audit.

It is recommended that OFB should consider deploying adequate resources for expeditious in-house development of electronic fuzes to cater to the requirement of Armed Forces.

2.5.2 Projects for development of new fuze items

Two OFs (OFK and OFAJ) undertook three R&D projects sanctioned between December 2001 and July 2004 at a total cost of ₹ 1.02 crore for development of three new (mechanical) fuzes as discussed below:

(i) Development of Fuze AVU ETM for Aerial Bomb 100-120Kg

OFB sanctioned (December 2001) a project for indigenous development of Fuze AVU ETM at OFK at a cost of ₹12.50 lakh with PDC of December 2003. The project was yet to be completed even 14 years after expiry of the PDC and expending ₹12.50 lakh as of March 2018. The main reason for delay was failure

[50] Only one electronic fuze *viz*. FB-40 for 40 mm PFFC ammunition is manufactured by OFB since 2005-2006 based on ToT acquired in 2001.

of OFAJ in developing the hardware components of the fuze which were still at the trial stage.

(ii) Development of empty Fuze AMR 20 HEI and SAPHEI

OFB sanctioned (July 2004) two projects for development of empty Fuze for HEI (High Explosive Incendiary) and SAPHEI (Semi-Armour Piercing High explosive Incendiary) types of 20mm AMR[51] ammunition at OF Ambajhari at a total cost of ₹89.50 lakh with PDC of January 2006. The projects were completed in January 2017 due to heavy production load of regular items at OF Ambajhari which compelled initiation of production of components for the new fuzes only in 2010-11. OF Khamaria, the indenting factory, accorded bulk production clearance (BPC) in March 2014 and placed IFDs for 10000 fuzes each in March 2014, December 2016 and January 2018. OF Ambajhari supplied the above quantity of fuze between May 2017 and March 2018.

OFB accepted the facts and stated (March 2019) that:

- OFAJ completed the projects for empty Fuze AMR 20 HEI and SAPHEI within revised[52] PDC of March 2016. After several queries, OFB approved the completion in January 2017. However, bulk production had not commenced in absence of target from the User;
- In view of premature functioning of newly developed Fuze AVU-ETM in trial, OFK planned to short-close the project by taking fresh R&D project;
- The performance of the Electronic Point Detonation (EPD) Fuze in field trial was satisfactory; and
- Delayed completion of the projects was due to unavoidable reasons and element of uncertainty in R&D of ammunition items. However, for time-bound completion of R&D projects on Fuzes, mid-term evaluation would be adopted as per feasibility.

Inordinate delays in completion/short-closure of the projects indicate lack of due importance given to the monitoring through mid-term evaluation in implementing the R&D projects.

2.5.3 Projects for up-gradation of existing fuze items

Four OFs undertook 10 projects for up-gradation of existing fuzes. These projects were sanctioned between January 2011 and February 2017 at a total cost of ₹2.44 crore. The projects were meant for development of various components[53] and

[51] Anti-Material Rifle
[52] Original PDC January 2006.
[53] Safety and Arming Device and Micro Electronic Detonator of empty Fuze FB-40 at OFK, Safety Lock Assembly and Spiral of empty Fuze A-670M, DD and PG Body of empty Fuze B-15 at GSF

process development/establishment of product line[54] relating to FuzeA-670M, FB-40, B-15 and 64C. The planned dates of completion (PDC) of the projects were between June 2012 and February 2018. Followings were noticed in Audit:

(a) Four projects at GSF and MTPF were completed belatedly between September 2016 and April 2018. Bulk production of Fuze FB-40 using alternative capacitor commenced at MTPF. But no bulk production clearance (BPC) was accorded for DD body at GSF.

(b) Other six projects at OFK, GSF and OFBL were yet to be completed even after expiry of the PDC by 18 to 72 months. Reasons for non-completion of the projects were failure of samples supplied by trade firms and unsuccessful in-house development of components. There was failure of pilot lots for process development of FB-40 and short-closure of project on establishment of empty components of Fuze 64C.

(c) Despite total expenditure of ₹1.79 crore (till March 2018) in execution of the 10 projects, no fruitful outcome was achieved except for production of Fuze FB-40 using alternative capacitor.

OFB stated (March 2019) that:

- There was no requirement of BPC relating to the project on Detonating Device (DD) body, and the project on Piezo Generator (PG) body is likely to be completed by June 2019 at GSF.
- As regards new composition for Fuze A-670M, OFBL could not fill the required quantity due to non-availability of passed proof empty components.

OFB's reply itself indicates their inability to complete the R&D projects within the PDC. The reply is also silent about the reasons for delayed completion/non-completion of five projects[55] and their outcome at OFK and GSF.

2.6 Conclusion and Recommendations

2.6.1 Conclusion

Ordnance Factories (OFs) did not have adequate capacity for production of empty fuzes and their filling with explosives to meet Army's requirement of fuzes for

[54]Empty components of Fuze 64-C at OFK, Use of alternative Capacitor for empty Fuze FB-40 at MTPF, Composition TO 34/PK-5 for filling of Fuze A-670M at OFBL

[55] SAD, filling process development of Fuze FB-40, process development of 64-C (OFK), Spiral and SLA for Fuze A-670M (GSF).

various ammunition for the period 2014-18. There were mismatches in availability of empty fuze from in-house production as well as from trade sources and their filling capacity in the factories.

Of 15 types of fuzes selected in audit, OFs were required to augment the production capacity of seven types of empty fuze and filling capacity of seven types of fuzes. However, as of March 2019, OFs augmented the production capacity of only one empty fuze as required and of another one fuze partially. Further, filling capacity of only one fuze was increased by the factories and that of other two fuzes were enhanced partially.

Based on the indents (orders) of the Users and production capacity of the factories, production targets of each year were fixed by OFB for the respective factories. However, the production targets were revised many times either at the instance of Users due to changes in their priority and budgetary allocation or by the factories owing to their production constraints. These constraints were mainly in timely availability of components/ input material, quality issues leading to significant Return for Rectification or rejection, delay in proof, *etc.*

In 19 out of 49 cases of upward revision, even the original targets, were not achieved by the factories. Further, of 32 cases of downward revision, the factories failed to achieve the final target in 22 cases.

OFB's slippages in production and supply led to critical deficiency of seven types of ammunition (ranging from 32 to 74 *per cent*) and five types of spare fuze (41 to 94 *per cent*) at the Users' stock. Moreover, due to non-availability of spare fuzes, Army had stock of 'P' lakh ammunitions worth ₹403.27 crore lying in unusable condition.

Ordnance Factories (OFs) had not taken adequate efforts for developing vendor base through source development OTE. Further, inordinate delay in procurement and inspection of input materials by feeder factories led to short-supply of empty fuzes to the filling factories.

Inadequate and ineffective quality checks both by the factories and quality assurance agencies (SQAEs) on input material and during manufacturing process led to significant quantum of RFR/rejection of fuzes. Further, delays in proof of empty/filled fuze contributed to delay/shortfall in issue of ammunitions to the Users. Besides, Joint Investigation/Failure Review Board and Defect Investigation (DI) failed in timely investigating the causes of rejection/accident and taking prompt remedial measures to avoid its recurrence.

Army's requirement of electronic fuzes could not be fulfilled by OFB due to its lack of infrastructure and capability. Hence, Army had to order 'S' lakh electronic fuzes (valuing ₹1,511 crore) during 2013-14 to 2017-18 on ECIL and BEL.

Little fruitful outcome was achieved from in-house development projects for up-gradation of existing fuzes due to inordinate delays in their completion.

2.6.2 Recommendations

1. Users/OFB must do away with the frequent revisions of requirement/production targets mid-year except for unavoidable circumstances. This would streamline the production planning and its execution in a time-bound manner.

2. Ministry/OFB needs to strengthen the monitoring of production performance of the OFs for addressing all the controllable bottlenecks timely. Ministry/OFB may take effective measures for time-bound clearance of all the outstanding indents of the Users for ammunition and spare fuzes.

3. OFB/DGQA needs to ensure that the prescribed quality checks are duly complied with recording all the relevant sample and test results.

4. Ministry/OFB should fix specific time limit and accountability for making the mechanism of Joint Investigation and Failure Review Board more effective.

5. DGQA, in consultation with the OFB and Users, should make a timeframe for conduct of proof testing of OFB products. Proof methodology may also be streamlined in line with ToT to obviate the subjectivity in the existing practice.

6. MoD/OFB should look into alternatives to conducting live firing/testing as proof trials for clearance of lots of empty and filled fuzes.

7. Ministry may look into the accountability of quality assurance agencies like CsQA/SQAEs in case of accidents/defects of the product passed by them in inspection.

8. OFB should consider deploying adequate resources for expeditious in-house development of electronic fuzes to cater to the requirement of Armed Forces.

Chapter - III: Other Audit Observations

3.1 Functioning of e-procurement system in Ordnance Factories

3.1.1 Introduction

Electronic procurement (e-procurement) is the process wherein the tendering activity is carried out online using internet and associated technologies. Government of India (GOI) took up e-procurement as one of the mission mode projects under National e-Governance Plan.

E-procurement system in Ordnance Factory Board (OFB) was developed by M/s m-junction Services Ltd. Kolkata at a contracted cost of ₹13.21 crore (revised to ₹18.99 crore). The contract included deployment and maintenance of e-procurement system in all the Ordnance Factories on a turnkey basis along with supply of the necessary hardware. The same was required to be completely installed and commissioned by September 2010. Finally, the application software was made operational in all Ordnance Factories from September 2011. The threshold limit for e-procurement was initially fixed by OFB at ₹10 lakh for all procurement cases. This was subsequently brought down to ₹2 lakh from 01 April 2016.

The audit of functioning of e-procurement system in Ordnance Factories was conducted to assess whether bidding process was transparent to ensure competitiveness and timeliness in tendering process. Audit also assessed if there were adequate provisions in e-procurement system for ensuring proper authentication of users/vendors.

The audit of functioning of e-procurement system in Ordnance Factories was conducted through scrutiny of documents and database of tenders processed through e-procurement system during 2015-18. During 2015-18, total 56,069 tenders valuing ₹36,173 crore were processed through e-procurement system in 41 Ordnance Factories[56]. Of them, 49,654 tenders (valuing ₹22,390 crore) pertained to store procurement, 2,709 tenders (valuing ₹12,467 crore) were for plant & machinery (P&M) and 3,706 tenders (valuing ₹1,316 crore) for civil works (CW).

The audit findings on functioning of e-procurement are detailed in the succeeding paragraphs:

[56]As per data supplied by m-junction (Developer of the application software) and OFB.

3.1.2 Minimum time for submission of bids

OFB's Procurement Manual stipulates minimum time allowed for submission of bids from the date of publication of the tender notice. It is three weeks in case of limited tender enquiry (LTE) and four weeks in case of open tender enquiry (OTE). However, audit noticed that this rule was not properly followed in the e-procurement system as given below:

- In 19,765 (LTE) tenders (73 *per cent*) less than 21 days were provided to the bidders for submission of their bids from the date of publication of tenders. Even in 2,824 cases where the bid submission dates were extended, total days given to vendors were less than 21.

- Similarly, in 18,331 (OTE) tenders (64 *per cent*), less than 28 days were provided for submission of bids. Further, in 1,746 cases where the bid submission dates were extended, total days given to vendors were less than 28.

- In 525 tenders valuing ₹258 crore, only one or two days were provided for submission of bids.

- In 148 tenders valuing ₹320 crore, the date of publication of tender and last date of submission of bids were the same.

Providing inadequate time for submission of bid may deprive the prospective bidders of participation in tendering process and, thus, raises doubt about fairness of the process.

In reply, Ministry stated that a reduced timeframe for submission of bids can be adopted in case of urgency and same is to be recorded in Tender Purchase Committee (TPC) minutes. Ministry further stated that all OFs and units have been directed (December 2018) to adhere to the relevant guidelines enumerated in OFB's Procurement Manual.

The reply of the Ministry is not convincing since provision of less time for submission of bids in 68 *per cent* of cases (in 38,096 cases out of 56,069 tenders) can hardly be considered as 'urgency'. There are separate provisions for procurement under urgency route. In the instances/cases, the tender enquiries were not flagged 'urgent'. Ministry may take appropriate action on delinquent officials. Adequate checks should have been incorporated in the system that, except in

emergency cases, the last date of bid submission cannot be less than three or four weeks from the tender publication date, as the case may be.

3.1.3 Frequent extension of last date of Bid submission

OFB's Procurement Manual has the provision of extension of tender opening date and stipulates that tender opening date may be extended where adequate response has not been received in a tender. As per provision of GFR, the number of supplier firms in LTE should be more than three.

It was observed that Factory Management had extended the last date of bids submission despite receipt of sufficient number of bids from the firms. Further, in many cases, it was not extended although bids were received from only one or two firms. It was further seen that:

- Out of 56,069 tenders (₹36,173 crore) processed, in 22,563 tenders (₹16,236 crore) the last dates of bid submission were extended.
- Out of these 22,563 tenders, it was seen that in 3,479 tenders (₹2,176 crore), last dates of bids submission were extended even after receipt of bids from three or more than three firms. Out of these, in 1,011 tenders (₹806 crore) the last dates of bid submission were extended despite receipt of bids from more than five firms.
- In 7,488 tenders (₹3,546 crore) bid submission dates were not extended despite receipt of bids from only one or two firms.

In response to the Audit observation, OFB issued (April 2019) instructions to all Ordnance Factories to ensure that:

- in case of less than three bids, e-procurement system does not allow more than one extension (not more than 6 days) in tender opening date,
- in case of three bids or more, no extension of tender opening date should be given, and
- in case of change in specification, items description and template of e-procurement, no extenstion should be allowed, instead the tender enquiry may be refloated.

3.1.4 Non-implementation of e-payment gateway

As per Standard Operating Procedure (SOP) of the e-procurement system, submission of tender fee and EMD from the bidders is to be ensured before proceeding for opening of tenders. For this, physical receipt of the corresponding documents (demand draft, bank guarantee *etc.*) is to be verified. This verification of submission of tenders and EMD could be done directly on the e-procurement system once the e-payment gateway was implemented.

Audit observed that e-payment gateway was not implemented till date failing which the contractors continue to submit their EMD through the conventional methods defeating the very purpose of automation.

The Ministry accepted that e-procurement system could cater to integration of payment gateway. It, however, stated that provision of submission of EMD electronically requires major policy decision like opening of separate current account by each factory/unit (other than Imprest). For opening of current account, Government approval was required.

Ministry's reply that this will require major policy decision and approval of Government is not clear as other Government organisations are already accepting electronic payment towards EMD.

3.1.5 Participation of Dummy users in the bid process

Vendor enrolment form had provision for enrolling vendors on the OFB's website with their particulars such as name, mobile/telephone numbers, e-mail address, Permanent Account Number (PAN), Digital Signature Certificate (DSC) *etc*. Further, vendors had to put login ID (user ID) and password of their choice for logging into the application software. Audit noticed that same vendors were using different User ID and different vendors were using same Digital Signature Certificate and phone numbers. In some cases, there were invalid Permanent Account Number (PAN), mobile/telephone numbers, *etc.* which are discussed below:

(a) Multiple User ID and DSC against the same vendor and vice-versa

Audit noticed that:

- In 299 cases, one vendor used more than one 'user ID' in the tendering process *e.g.* M/s R L Machine Tools used 6 different user IDs for participating in the tender activities.

- In 207 cases, one vendor used more than one DSC in the tendering process *e.g.* five DSCs were used by M/s S S Enterprises for participating in the tenders.

- Further, in 264 cases, one DSC was used by more than one vendor *e.g.* one DSC No. 1d7f879f01000a36 was used by seven vendors under seven different IDs. Surprisingly, it was noted that in 120 cases, multiple users used same DSC in a single tender. Some of which are also indicated below :

Table-20: Participation of multiple bidders in a tender using same DSC

User ID	DSC No	e-mail ID
Tender no 121PMETT17000254 valuing ₹5.67 crore issued by OF Bhandara on 17.02.2017 for supply of vertical hydraulic extrusion press		
ACHIEVEHYDRAULIC	**535adaoe**	**info@achievehydraulics.com**
ACHIEVEHYDRO	**535adaoe**	**info@achievehydraulics.com**
Tender no 113PMETT17000156 valuing ₹5.43 crore issued by OF Kanpur on 03.03.2017 for supply of CNC single spindle sliding head automatic leathe machine		
GALAXYMACHINERY	**doad14**	**elango@galaxymachinery.com**
GALAXYTAJMAC	**doad14**	**elango@galaxymachinery.com**
Tender no 129MMETT18002037 valuing ₹1.86 crore issued by OF Chanda on 15.02.2018 for supply of saddle assembly for shaped charge		
SHREESAIIND	**5344cdf7**	**snehenggworks@rediffmail.com**
SNEHENGG	**5344cdf7**	**snehenggworks@rediffmail.com**

From the above, it emerged that dummy users had participated in the bidding process raising questions about reliability of the system**.** Use of same DSC by multiple users in a tender defeats the very purpose of secured online bidding. Thus, due to absence of relevant checks, the authenticity of the bids could not be ensured.

The Ministry in its reply stated that one bidder may require to use more than one DSC if it expired during tender process because under such circumstances, the bidder has to take new DSC. It, however, stated that one user ID as well as one DSC should not be used by more than one bidder. It stated that the matter has been taken up with the service provider to put restriction/check in the e-procurement system for the same. However, action taken on the cases pointed out by Audit has not been highlighted.

(b) Duplicate Phone Number / e-mail ID / alternate e-mail ID

During analysis of Vendor profile data supplied by m-junction/OFB, it was noticed that :

- In 350 out of 10,790 cases, same phone number was used by different users. In one case, phone number 932434XXXX was used by five different user IDs.

- In 307 cases, same e-mail ID was captured against different user IDs; In one case e-mail ID –meeranivetha@gmail.com was used by 15 user IDs.

- In the e-procurement system, there was a provision of entry of alternate e-mail ID for recovery of e-mail ID. It was found that in 203 cases, e-mail was different but their alternate e-mail ID entered by the vendors for recovery of their e-mail ID was same. This indicated that either the users are linked to each other or multiple user IDs were operated by the single firm.

Thus, due to absence of relevant checks in the e-procurement system, there was incorrect enrolment of vendors and the possibility of participation of fake or dummy bidders in the bids cannot be ruled out. Further, the objective of providing transparency in the procedure is compromised by this way.

The Ministry accepted the audit observations and stated (April 2019) that the matter has been taken up with service provider to put restriction/check in the e-procurement system for the same.

(c) Capturing of invalid PAN number/Phone number

Permanent Account Number (PAN) and phone number both are unique data entered by the vendor at the time of enrolment. During analysis of Vendor profile data, it was noticed that :

- In 174 out of 10,790 cases, invalid PANs were captured in the vendor profile database. In some cases, there were peculiar entries such as “Exists PAN”, “Already ex”, “1111111111”, “1212121212” *etc.* Further, in 1,023 cases, PAN field was blank.

- There was no mechanism to verify the correctness of mobile/telephone numbers in the e-procurement system. In 62 cases, invalid mobile/telephone numbers were entered by the bidders while registering themselves in the e-procurement system. Some of the invalid mobile/telephone numbers captured in the system were “00000”, “1904”, “11111”, “533” *etc.*

Thus, due to lack of input control, the system was capturing the invalid entry affecting the accuracy and completeness of data.

The Ministry accepted the facts and stated (April 2019) that the matter has been taken up with the service provider to put check for the pattern of PAN number.

3.1.6 Participation of multiple bidders in a tender from same machine/ IP address

One of the main objectives of the e-procurement was to provide transparency and competitiveness in tendering process.

Analysis of data of tenders processed during 2015-18 through e-procurement system revealed that:

- In 9,561 tenders valuing ₹5,096 crore, two to ten bidders had submitted their bids from the same machine/IP address. Significant number of vendors who had submitted their bids from the same machine were having same e-mail ID (in 321 cases) or same phone number (in 358 cases). Even instances of submission of multiple bids from the same machine by the bidders having both e-mail ID and phone number similar were noticed, some of which are indicated below:

Table-21: Participation of multiple bidders from the same machine having same e-mail ID and phone number

User ID	IP Address of the machine	e-mail Id	Phone No
Tender no 102MMETT16001679 valuing ₹2.09 crore issued by Ordnance Equipment Factory Kanpur on 29.10.2016 for supply of aluminium alloy sheet			
KIRANALUMINIUM	27.4.207.92	viren@kiranaluminium.com	9869021174
VIREN123	27.4.207.92	viren@kiranaluminium.com	9869021174
Tender no 117MMETT15001245 valuing ₹0.66 crore issued by Small Arms Factory Kanpur on 16.11.2015 for supply of body housing lower and trigger mechanism assembly			
RWTUJA345	43.228.73.63	kadampravin32@yahoo.com	7276092656
TANVI567	43.228.73.63	kadampravin32@yahoo.com	7276092656
Tender no 118MMETT16001538 valuing ₹0.63 crore issued by Ordnance Factory Bhusawal on 31.12.2016 for supply of engaging plate for box			
SGIW66	117.218.141.132	accounts@shreeganeshind.com	2244100
SGMWE91	117.218.141.132	accounts@shreeganeshind.com	2244100

- For 689 tenders valuing ₹267 crore, all the bids were submitted by participating bidders from the same machine/IP address. In one case, against one TE No. 127MMETT16002395, total 10 bidders had submitted the bids and all the bids were submitted from the same machine.

Submission of bids by multiple bidders against one tender from the same machine indicates the possibility of participation of dummy users in the tender or cartelisation amongst bidders. Moreover, transparency and competitiveness in tendering process could not be ensured.

OFB accepted the facts and stated (September 2018) that they will investigate the points raised by Audit.

The Ministry stated (April 2019) that normally the bids are to be submitted from different machines/IP address by the bidders. But, there are occasions, when small vendors submitted their bids from cyber cafes. Under such circumstances, there is possibility of submission of multiple bids from same machine/IP address. It further stated that the matter had been taken up with service provider to put restriction/check in the e-procurement system for the same. Ministry's justification was not clear on how the different vendors located at different locations used the same cyber café for bidding against the tender enquiry.

3.1.7 Security of the 'sensitive' data of Government

To prevent misuse by the e-procurement service provider, DeitY/STQC guidelines recommended that service provider should not have access to the 'source code' of the e-procurement software.

Audit noted that the e-procurement portal of OFB was developed and operated by the same entity *i.e.* M/s m-junction which is having the source code of the software. Since M/s m-junction, being a developer as well as service provider, it is a risk that database of a defence organisation is accessed by a private entity.

Ministry stated (April 2019) that the tender for e-procurement system was issued in 2009 and supply order was placed in 2010. STQC guidelines were issued in 2011 which describe four models for adopting e-procurement system. The condition of not having access to the source code by the service provider was for case of dedicated portals. Initially OFB explored to adopt NIC's e-procurement platform but at that time, NIC's platform was not matured enough to cater the need of complex and special requirement of all Ordnance Factories. Hence, OFB adopted the model where the Government organisation procures and owns the system, which is managed by the service provider with adequate security controls.

However, unlike other Government organisations, the source code was with the service provider. Audit noted that in order to implement centralised database/SAP/ERP for Ordnance Factories, OFB, since November 2016 had been exploring to adopt NIC's e-procurement system after necessary customisation or to develop new system for OFB. However, OFB was yet (January 2019) to finalise the future course of action. Meanwhile, the present contract with M/s m-junction expired in September 2018, OFB extended the maintenance and operation of the present e-procurement system for further period of two years at a cost of ₹6.50 crore.

3.1.8 Conclusion

Rules and procedures stipulated in Procurement Manual of Ordnance Factory Board were not followed completely in its e-procurement system. In many cases, there were frequent and arbitrary extensions of last date of submission. Transparent bidding could not be ensured as instances of submission of multiple bids from a single machine and use of same Digital Signature Certificate by multiple users in a tender were noticed. This indicated the possibility of cartelisation amongst bidders or participation of dummy users in a tender. The e-procurement system lacked appropriate checks for capturing of duplicate e-mail ID/alternate e-mail ID/phone number, invalid PAN and phone number *etc.* Further, the same firm being developer as well as service provider of the e-procurement portal, database of the defence organisation may be at risk of access by a private entity.

3.1.9 Recommendations

- The Board may ensure that manual provisions have been completely mapped in the application software.
- E-payment gateway should be implemented in the e-procurement system.
- The Board should discourage frequent extension of last dates of bid submission. Appropriate checks may be immediately put into the system to address the issue of duplicacies in inputs and participation of dummy users.

3.2 Operation of Bank Accounts in Ordnance Factories

Under the manual system, Ordnance Factories had opened Public Fund Accounts (PF Accounts) with Nationalised Banks for payment and deposit of Government receipt. The alternative online payment system through Cash Management Product (CMP) Centre Branch of State Bank of India, Mumbai was introduced in 2014-15. However, this was not fully utilised. The proposal (August 2016) of Controller General, Defence Accounts for depositing Government receipts to Government Account within T+1 working days through e-MRO, was also not fully implemented.

Failure to implement the online payment and receipt system resulted in float of huge Government money in the PF Accounts which was fraught with the risk of unwarranted, mala-fide withdrawals. Besides, there were internal control failures in arresting the opening of a number of Bank Accounts over and above the Public Fund Accounts.

These failures led to parking of funds in PF Accounts, delay in payments to the payees and depositing Government receipts to Government Account. Accounting and reconciliation of receipts and payments and reporting thereon were not in order for PF Accounts.

Introduction

All revenues received by the Government by way of taxes and other receipts flowing to the Government in connection with the conduct of Government business *i.e.* Non-Tax Revenues are credited into the Consolidated Fund of India (CFI) constituted under Article 266 (1) of the Constitution of India. Article 114(3) of the Constitution stipulates that no money shall be withdrawn from the CFI except under appropriation law passed by the Parliament. As per rule 6 of Central Government Account (Receipts and Payments) Rules, 1983, all moneys received by or tendered to Government officers on account of revenues or receipts or dues of the Government shall, without undue delay, be paid in full into the accredited bank (Reserve Bank or any bank[57] which is appointed to transact business of the Government) for inclusion in Government Account.

[57]"bank" means any branch of the State Bank of India acting as the agent of the Reserve Bank of India in accordance with the provisions of the Reserve Bank of India Act, 1934 (2 of 1934), any branch of a subsidiary bank as defined in section 2 of the State Bank of India (Subsidiary Banks) Act, 1959 (38 of 1959) which is authorised to transact Government business as agent of the State Bank of India, or any branch of a bank as may be appointed by the Reserve Bank of India as its agent under the provisions of sub-section (1) of section 45 of the Reserve Bank of India Act, 1934 (2 of 1934) .

3.2.1 Public Fund Accounts

Receipts and disbursement of public money in case of Ordnance Factories are made through Public Fund Accounts opened by the individual factories. These accounts are called General Manager's Public Fund (GM's PF) Accounts. Public Fund Account can be opened in State Bank of India or in any nationalised Bank which has the capacity to meet cash requirement at short notice. The Cash offices of the factories, operate the PF Accounts and maintain cash books.

Receipts/revenues due to the Government are first deposited in the PF Account. Cash office, after making entry in the receipt side of the Bank Column of the Cash Book, raises a Challan, called Military Receivable Order (MRO). It then issues cheques with MRO in favour of Reserve Bank of India (RBI) for remitting the receipts to Government Account.

In respect of expenditure/disbursement, bill section of factory submits various types of bills of their officers/staff and third parties (henceforth referred as payees) to its Local Accounts Offices (LAOs) and in some cases to Principal Controller of Accounts (PCA) (Factory). LAOs/PCA (Fy), after passing the bills, remit the amount of bills passed, from the concerned Head to the Public Fund Accounts through Cash Management Product (CMP) Centre of State Bank of India. The cheque slips of the amount remitted to PF Account is sent to Cash Office of the factory for release of payments. This system has been operational in 41 factories from 2015-16 onwards. In some cases, LAOs/PCA (Fys) make payments through cheques also. Cash Office then issues advices to the Banks for disbursement to payees.

Cash Office of the factory has to prepare a monthly statement showing the amount of cash in hand and in bank and details of the bills which have to be paid with regard to these balances.

Audit was conducted to examine the necessity and administration of PF Accounts. It also assessed the operationalisation of Cash Management Product (CMP) and online remittance of money (e-MRO).

Audit covered the period from 2015-16 to 2017-18. Out of 41 Ordnance Factories, 14[58] factories were selected in audit for detailed examination.

Audit Findings

Issue-wise audit analysis of system failure and views of OFB are discussed in the succeeding paragraphs.

[58]RFI, GSF, MSF, OFBL, OFMK, OFC, SAF, OFV, OF Trichy, OFA, OFCH, OFI, OFK and AFK

3.2.2 Bank Accounts opened without proper authorisations

OFB issued (June 1983) detailed guidelines circular to all factories for opening of Public Fund Accounts with the Nationalised Banks. As per the guidelines, the accounts were to be opened with the prior approval of OFB. Further, only one Public Fund Account was to be operated by one Factory.

Audit noticed that there was one Bank Account each in case of 25 factories. Eleven factories[59] had two Bank Accounts each, four factories[60] had three Bank Accounts each and one factory[61] had four[62] Bank Accounts. Thus, 41 factories had total 63 bank accounts during the period from 2015-16 to 2017-18.

In reply to specific query about the authority for opening of additional Bank Accounts, not a single factory could produce any document conveying explicit authorisation in support of those additional bank accounts.

On the basis of information furnished by factory management, Audit found that:

- Eleven accounts were opened with the approval of OFB.
- Thirty two accounts were opened with the approval of General Manager. General Managers were, however, not empowered to authorise opening of Bank Accounts.
- Four accounts were stated to have been opened with the approval of competent authority. But the factories did not clarify who is the competent authority in this matter.
- Three accounts were opened as per Cash Drill Procedure. Audit, however, observed that Cash Drill Procedure was meant for accounting of cash and maintenance of Cash Book in factories. Cash Drill, thus, cannot be the source of authorisation for opening Bank Accounts.
- One account was opened under intimation to PCA (Fys), which was not in order.
- In respect of opening of 12 accounts, the factories did not say anything about authority.

This indicates that OFB (Finance Division) and PCA (Fys) were not aware of the actual number of Bank Accounts in operation at factory level. Local Accounts offices attached to the factories did not have any functional responsibility over the

[59] MSF Ishapore, OF Badmal, GCF Jabalpur, VF Jabalpur, OF Dehradun, OF Muradnagar, OCF Chandigarh, OCF Sahajanpur, AF Kirkee, HEF Kirkee and OF Dehu Road
[60] OFK, SAF, OFC and FGK
[61] GSF
[62] Of which two Bank Accounts i.e. "GM Pistol Account" and "GM Pistol Account (Payment Gateway)" were closed in March 2017 by GSF

financial transactions carried out through these Bank Accounts. Their responsibility ceased with the transfer of money to Public Fund Accounts.

These 63 Bank Accounts recorded receipts of about ₹22,261 crore and disbursement of about ₹20,690 crore during last three years ending March 2018. Government money of ₹154 crore remained parked in 60 Bank Accounts in operation as on 31 March 2018. One Bank Account of OCF Chandigarh was put on hold in January 2017. Two Bank Accounts of GSF Cossipore and one Bank Account of OFBL were closed in March 2017 and December 2018 respectively.

OFB stated (April 2019) that they had instructed all Sr. General Managers /General Managers of the factories to close all these accounts other than single Public Fund Account with immediate effect and the proceeds of those accounts to be transferred to PF Account without any delay.

3.2.3 Operation of Bank Accounts without Cash Book

Rule 13 of the Receipt & Payment Rules 1983 provides that all monetary transactions should be entered in the Cash Book as soon as they occur and attested by the Head of the Office in token of check.

Audit examination, revealed that nine factories[63] did not maintain Cash Book in respect of 12 out of 22 Bank Accounts. GSF and FGK maintained only one common Cash Book for their respective two Bank Accounts which was not regular. Hence, these factories did not prepare Bank Reconciliation Statement in the absence of Cash Book separately for each individual Bank Account. Thus, incorrect accounting or arbitrary deduction, if any, made in these accounts by the banks, would remain undetected and uncorrected**.**

The factories were asked (July/August 2018) to furnish total receipts and disbursements through these 22 Bank Accounts and balance in such Bank Accounts as on 31 March 2018. The factories furnished information of total receipts aggregating to ₹4,172 crore and disbursement of ₹3,376 crore through these Bank Accounts during 2015-16 to 2017-18**.** 20 out of 22 Bank Accounts were holding balance of ₹38 crore as of 31 March 2018. Remaining two Bank Accounts at GSF were closed in March 2017. In the absence of Cash Books for these Bank Accounts, the amount remained unaccounted for in the Balance Sheet of OF organisation.

[63]MSF,GSF,OFBL,GCF,SAF,OFDR,OFC, FGK and VFJ

3.2.4 Status of operationalisation of CMP in Local Accounts Office

CGA authorised (August 2012) Cash Management Product (CMP) Branch of State Bank of India, Mumbai to act as a designated e-Focal Point Branch (FPB) to effect e-payment to the payees through various electronic mode in Ministry of Defence. The payment files received from Accounts Offices are processed by the CMP to release payment to the payees and credited into accounts of the payees. This is either on the same day (T+0) if payment files is uploaded before 3.30 pm or credited on the next day (T+1), if uploaded after 3.30 pm. SBI claims reimbursement of fund from RBI CAS Nagpur through the settlement mechanism approved by RBI. CMP was operationalised in OF Organisation (41 OFs and PCA (Fys)) in phases from May 2014 to March 2015.

Audit analysed sample disbursements of payments through CMP. Analysis of Audit and the status of remittance of fund to PF Account by PCA (Fys) and LAOs through CMP are reflected in **Table-22** below:

Table-22: Status of payment directly to payees and remittance of fund to PF Accounts

(₹in crore)

Year	Unit	Payment directly to payees Account	Payment to "GM Public Fund Account"	Total Disbursement	Percentage of payment to payees through CMP
2015-16	PCA/Fy	274.62	156.50	431.12	*64*
	40[64]LAOs	7812.23	**4585.12**	12397.35	*63*
Total		**8086.85**	**4741.62**	**12828.47**	
2016-17	PCA/Fy	263.40	166.80	430.20	*61*
	41 LAOs	10877.23	**4337.89**	**15215.12**	*71*
Total		**11140.63**	**4504.69**	**15645.32**	
2017-18	PCA/Fy	127.67	145.97	273.64	*47*
	41 LAOs	10501.75	**4096.60**	**14598.35**	*72*
Total		**10629.42**	**4242.57**	**14871.99**	

Audit examination revealed that, even after introduction of CMP for payment directly to the Bank Accounts of payees, a total of ₹13,489 crore during 2015-16 to 2017-18 were transferred to the PF Accounts for various type of payments[65]. Such transfers were avoidable after introduction of CMP.

Resultantly, this caused delay in releasing payments as discussed below:

In 14 sample factories, Audit requested (October 2018) to provide mapping of receipts of fund into Bank accounts with subsequent payments therefrom to the

[64]Information from RFI was not received

[65]LTC, TA, DA, Leave encashment, Medical Advance, Final Bills, Arrear Bills, PLB, Subsistence Allowances, Contingent payments, retirement benefit, GPF, CGEGIA, Imprest, CEA, arrear Transportation Allowances, HRA, EL encashment, Gratuity, Pension, IEs wages professional Tax, HBA, Stipend

payees. None of factories could furnish this information. Audit also approached (October 2018) the factories to pursue the concerned Banks to provide the same information. The Banks also did not furnish the required information.

Audit test checked 2,745 cases (₹109 crore) on random basis in these 14 sampled factories. In 386 cases (₹38 crore), the payment was made to the payees within T+1 working days.

In remaining 2,359 cases (₹70 crore) there were considerable delays in making payments to the payees. The delay ranged from five days to more than 90 days.

SAF Kanpur, AF Kirkee, OF Badmal had comparatively more cases of delay in making payments to payees. Further, MSF Ishapore and OF Medak accounted for about 60 *per cent* of total amount of delayed payments.

The reasons cited (May 2019) by OFB were mainly non-receipt of details of bills from concerned bill sections of the factories, belated receipt of cheque slips from Accounts office and non-submission of bank details of retired, expired employees in time by user sections.

The aforesaid replies are not acceptable as delay in making payment to the payees could have been avoided had the payment been made to the payees' account through SBI CMP.

3.2.5 Non-operationalisation of e-MRO in OFs

Ministry of Finance, Department of Expenditure issued (March 2016) guidelines for payment of Government money into the accredited Bank branch of the Ministry /Department through Debit /Credit Cards and Net Banking facility. This, *inter alia*, provided that the Ministries/ Departments would make necessary arrangement through their accredited bank authorized by RBI for handling Government transactions under section 45(1) of RBI Act 1954. The Ministries/ Departments and their respective accredited banks were to create facilities online at the payment gateway for payment of money through Debit/Credit card and Net Banking. In compliance with this instruction, Controller General Defence Accounts had sent (August 2016) direction to OFB for depositing Government receipts into Government Account through e-MRO.

The e-Receipt gateway was, however, not operationalised in OFs in full-fledged manner till October 2018.

Audit further noticed that amount deposited into Government Account through MRO prepared manually was ₹2,352 crore, ₹2,194 crore and ₹2,434 crore during 2015-16, 2016-17 and 2017-18 respectively. PCA (Fys) stated (September 2018) in reply to Audit that e-MRO portal was being utilised by different OFs with

effect from 1 April 2018. The achievement in raising MROs through electronic mode was to the extent of 6 *per cent* of total MRO till 31 July 2018. Audit observed that only five[66] out of 41 factories had introduced e-MRO in 2018-19 till October 2018.

Audit also enquired (October 2018) about constraints, if any, for non-operationalisation of e-MRO in selected 14 factories. OFB/Factories in their replies (October /November 2018 and May 2019) stated that four factories did not receive Standard Operating Procedure (SOP) for implementation of e-MRO and implementation was under process in remaining nine factories. E-MRO at GSF was implemented. OFB further stated in reply that they had instructed all Sr. General Managers /General Managers of the factories to fully implement e-MRO system. Thus, even after more than three years, the e-MRO system could not be implemented in Ordnance Factories.

3.2.6 Delay in depositing Government receipts into Government Account

The remittance period for transferring fund to Government Account for all Government transactions made through e-payments in respect of Public Sector Banks is T+1 working days with effect from November 2010. Cash Drill Procedure for Ordnance Factories provides that cash received or realised in satisfaction of Government dues[67] should be remitted into the Treasury at the very first opportunity *i.e.* once a week. The Cash Drill Procedure was, however, not revised in tune with the Government Order of October 2010.

Audit test checked 2,923 cases (₹590 crore) on random basis in 14 sampled factories and found that in 911 cases (₹250 crore), MROs were raised within seven days. In remaining 2012 cases (₹340.39 crore) in 14 factories, there were considerable delay in raising MROs for depositing Government receipts into Government Account. Delays in raising MROs are indicated in **Table-23** below:

[66]GSF Cossipore, OF Dehu Road, GCF Jabalpur, OF Katni and OF Bhandara.
[67]e.g. recovery towards house rent, sale of timber/fire wood/coal, conservancy tax, etc.

Table-23: **Delay in Depositing Govt. Revenue/ Receipt into Govt. Account**

(₹in Crore)

Sl No	Name of the Factory	Delayed 1 to 8 days		Delayed 9 to 23 days		Delayed 24 to 83 days		Delayed above 83 days		Total No of Cases	Total Amount
		No of Cases	Amount	No of Cases	Amount	No of Cases	Amount	No of Cases	Amount		
1	RFI	2	13.29	11	9.61	21	4.94	16	2.04	50	29.88
2	GSF	4	0.53	17	4.46	42	3.83	20	4.95	83	13.77
3	MSF	48	4.4	49	4.57	8	1.3	0	0	105	10.27
4	OFBL	93	0.35	61	0.16	30	5.32	0	0	184	5.83
5	OF Kanpur	156	2.25	119	3.76	30	0.87	7	0.24	312	7.12
6	SAF	308	26.62	252	14.57	44	2.22	0	0	604	43.41
7	OFV	19	0.09	47	0.44	27	5.23	7	6.28	100	12.04
8	OF Trichy	99	12.20	77	27.99	47	4.77	19	0.19	242	45.15
9	OFCH	18	14.23	20	25.65	8	14.12	7	0.13	53	54.13
10	OF Itarsi	8	0.64	1	0.22	0	0.00	1	0.02	10	0.88
11	OFK	101	75.01	32	29.80	0	0.00	0	0.00	133	104.81
12	AFK	5	0.30	6	3.46	5	1.61	7	0.46	23	5.83
13	OFA	6	2.23	7	1.83	5	0.68	0	0	28	4.74
14	OFMK	61	2.05	20	0.41	3	0.05	1	0.02	85	2.53
Total		938	154.19	719	126.93	270	44.94	85	14.33	2012	340.39

It could be seen from the above that in depositing revenue/receipt into Government Account also, SAF Kanpur had maximum cases of delays. Further, OF Khamaria had one third of the amount of delayed revenue/receipt, however, maximum cases of delays were up to 8 days.

Factories/OFB stated (October/November 2018 and in May 2019) in their replies that delays in raising MROs in 14 selected factories were mainly due to:

(i) non-submission of adequate details by the clients for the deposits that they made (OFMK),

(ii) lack of connectivity of SBI net services (OFA),

(iii) unanticipated reasons (MSF),

(iv) non-linking of source /origin of deposits and non-availability of information required for raising MROs from concerned sections of the factories (OFK, OFV, OFC, AFK, OFBL and GSF).

The reasons adduced were mostly controllable and issues raised can be addressed by coordinated action. These issues could be eliminated, if e-MRO is made functional in all factories, to avoid manual intervention in depositing Government receipts into Government Account.

3.2.7 Float of fund in Bank Accounts

Delay in making payment to the payees and in raising MROs from PF Accounts as discussed in earlier Paragraphs caused holding of huge amount of Government money in the Bank Accounts.

Audit noticed that the Banks were holding Government money of ₹93 crore, ₹131 crore and ₹128 crore in 51 Accounts as on 31 March 2016, 2017 and 2018 respectively. The closing balance as of 31 March in almost all Bank Accounts were always much higher than the balance shown in the Cash Book, where such Cash Books were maintained by the factories.

Holding of huge fund in the Bank Accounts was mainly due to:

(a) Delay in recording or non-recording of receipts in the Cash Book resulting in further delays/non-issue of instructions to Bank for payment to payees; and

(b) Delay in raising or non-raising MRO for depositing Government receipts into Government Account within T+1 working day.

Resultantly, an amount of ₹154 crore remained parked in 60 Bank Accounts (*i.e.* outside Government Account) as on 31 March 2018.

OFB Stated (April 2019) in reply that they had instructed all Sr. General Managers /General Managers of the factories to close all bank accounts over and above single PF Account for each factory. The balance of those accounts should be transferred to PF Account without delay. OFB further instructed to maintain minimum balance in PF Account at the end of the month as well as at the end of the year.

3.2.8 Shortcomings in preparation of Bank Reconciliation Statement

Reasons for difference between bank balance as per Cash Book and Bank Statement can be traced; tracked and corrective action can be taken if Bank Reconciliation Statement (BRS) is prepared correctly. This helps also in detecting errors in recording the transactions or fraud, if any, and in ascertaining the correct bank balance on a particular date.

Both e-Payment Gateway and e-MRO have in-built system of accounting and reconciliation of day to day collection and payments of Government money and to generate reports on day to day basis.

Audit noticed that this accounting and reconciliation of receipts and payments and reporting thereon were not in order in respect of PF Accounts maintained by the factories. Audit examined BRS in 14 out of 41 factories and found weakness or

lack of proper system in preparation of BRS. In seven[68] factories, BRS was prepared in the format prescribed by the Chief Internal Auditor (OFs) in January 1989. This format did not provide the scope of complete reconciliation of cumulative closing balance of Cash Book and Bank Statement. This is because the reconciliation was done after adjusting the difference between opening Cash Book and Pass Book balance. Thus, in absence of complete reconciliation, the concerned factories could not take necessary corrective measures.

In remaining seven factories[69], though complete reconciliation was carried out on year-end cumulative balance, Audit noticed a number of weaknesses due to lack of professional skill in preparation of BRS. For example, transactions which had already been entered in both Cash Book and Bank Pass Book were shown as reasons for discrepancies in BRS. Corrective entries were delayed or not made with proper linking of supporting documents of bank transactions *viz*. order number, unit transaction reference number, invoices, payment advice, *etc.*

The Cash Offices had been preparing ineffective Reconciliation Statement consistently. Chief Internal Auditor (OFs) also did not point out defects in preparation of BRS and suggest remedial measures during the period covered by audit. Improper preparation of BRS was fraught with the risk of inaccuracy in accounting system and cash defalcation.

Factory-wise position of discrepancies is indicated in the **Annexure-IV.**

OFB stated (April 2019) that they had instructed to all HoDs of the factories to maintain Cash Book properly, to collect bank statement and to reconcile in every month.

3.2.9 Defalcation of ₹6.56 crore in Rifle Factory, Ishapore

Audit had pointed out (July 2015 and April 2017) non- submission of Cash Book to Audit as well as non-updating of Cash Book of PF Account since 2010 by Rifle Factory, Ishapore (RFI) in its Inspection Report. Audit asked (May 2018) RFI to furnish Bank Reconciliation Statement for last three years ended on 31 March 2018. RFI could produce BRS for the years ended on March 2017 and March 2018. They stated (May 2018) that BRS of PF Account was not prepared for the period from April 2010 to June 2016.

On further enquiry, Audit came to know that a Task Force was constituted by General Manager, RFI to enquire into improper accounting of funds in Cash Book drawn from PF Account and its disbursement and closing balance in the Cash Book. The Task Force pointed out that (April 2017) a cash defalcation of

[68]OFBL, MSF, RFI, GSF, OFCH, OFV & OFC
[69]OFT, OFMK, AFK, OFA, OFI, OFKH & SAF

approximately ₹1.70 crore had occurred during the period from 1 January 2012 to 5 July 2016. Subsequently, in October 2017, OFB lodged a First Information Report (FIR) with Central Bureau of Investigation (CBI) Kolkata against Cashier and other suspected officials of RFI. On the advice of CBI, OFB had conducted forensic audit which pointed out discrepancies/ cash defalcation of ₹6.56 crore during the period from 2010 to July 2016.

Vigilance Department of OFB stated (March 2019) that the case involved a large scale mis-utilisation and mismanagement of cash. The same was under investigation by CBI.

Audit is of the view that the defalcation was result of inherent weaknesses of the system and lack of internal control in maintenance of cash and Cash Book in the factories. If no corrective actions are taken immediately, the recurrence of such incidents in other factories cannot be ruled out.

3.2.10 Withdrawal of Money from PF Accounts for departmental expenditure

Rule 7 of Central Treasury Rules provides that "Money received on account of revenue receipts shall not be appropriated to meet departmental expenditure". Test check by Audit revealed cases of withdrawal of money from PF Accounts for departmental expenditure without any authority as discussed below:

Audit observed that-

- OF Itarsi and OF Khamaria had spent ₹1.51 crore and ₹2.46 crore out of receipts during last three years ending March 2018. OF Itarsi replied (October 2018) that Cash Office received the Government revenues and made the payment regarding factory expenditure whenever required and the amount paid in cash was less than ₹5,000.
- OF Trichy had withdrawn ₹5 lakh through self cheques in March 2018. OF Trichy spent the above amount for payments of trial team and for observing Ordnance Factory day celebrations.
- SAF Kanpur had withdrawn ₹5.90 crore during the period from April 2015 to March 2018. In reply to Audit, SAF stated (November 2018/January 2019) that fund was withdrawn from PF Account as per the instructions of the General Manager. It further stated that expenditures were done to make payments of Imprest Fund, for Raj Bhasha Programme, Official Meetings, Cash Awards, OF Day function, Dearness Allowance arrear, advance payment of Salary /Tour Allowance, and other miscellaneous expenditure.

All the above cases and similar instances in these factories need to be checked by Internal Audit to have an assurance on the expenditure made without proper budgetary approval. Systemic improvements are needed to prevent these irregular expenditure.

3.2.11 Other Irregularities

(i) Gun and Shell Factory **(**GSF), Cossipore opened unauthorisedly "GSF Pistol A/C No 3121015420" in May 2011 and "GSF Pistol A/C No 3333300812 (Payment Gateway)" in March 2014 to receive deposits from customers for sale of pistol and to refund to the customers either on cancellation of booking or on submission of incomplete information. GSF did not maintain Cash Book for these Bank Accounts. When objected by Audit (September 2016) with regard to improper opening of Bank Accounts, GM/GSF closed the receipt transactions from 19 December 2016 in both the Bank Accounts. However, debit transactions continued thereafter for regular fund transfer and refund to customers till final closure of both the Accounts on 14 March 2017.

GSF Stated (March/July 2017) that total receipt in "GSF Pistol A/C" was ₹580.26 crore from 2011 to December 2016. Out of them, GSF deposited ₹543.53 crore to Government Account and refunded ₹34.07 crore directly to the customers in 6,620 cases from "GSF Pistol A/C", without depositing the money first into Government Account. Refund was, therefore, not in compliance with the Rule 186 of Receipt & Payment Rules meant for refund of Government deposit. There was balance fund amounting to ₹3.59 crore in GM GSF Pistol A/C No 3121015420 and ₹85.34 lakh in GM GSF (Payment Gateway) Account No 3333300812, thus total ₹4.45 crore at the time of closure (14 March 2017) of both the Accounts. GSF transferred (14.03.2017) the balance amount to GM Public Fund Account 310144XXXX maintained with Central Bank of India. GSF raised MROs for depositing the amount collected in Pistol A/c, to Government Account after 28 to 546 days. They deposited the amount collected in Payment Gateway Account (₹82.18 lakh out of ₹85.34 Lakh) to Government Account after 91 days.

(ii) The PCA (Fys), Kolkata had instructed (August 2013) that Security Deposit, other than in the form of bank guarantee, shall be obtained in the name of PCA (Fys), Kolkata. In no case, such deposits should be lodged in PF Account. Further, OFB clarified (November 2015) that performance security deposit (PSD) in the form of Bank Guarantee/Demand Draft /Fixed deposit was to be deposited in favour of PCA (Fys), Kolkata instead of in GM Public Fund Account.

Audit scrutiny revealed that in three cases Security Deposits of ₹14.18 lakh in the form of Fixed Deposit Receipts were obtained (August 2015 to January 2018) in favour of GM, OFI.

OFI stated (March 2019) in reply that they obtained PSD in the A/c of PCA (Fys) from 1st December 2015. Prior to that date, they collected PSD in GM Public Fund Account. Thus, the practice followed by OFI of obtaining Security Deposits in favour of the GM OFI was in violation of the instructions issued by PCA (Fys).

Similarly, OFK received ₹20.95 lakh during the period from June 2015 to March 2018 from private parties towards Security Deposits (SD) in instruments like Demand Draft. They deposited the amount first in the 'GM Public Fund Account'. Thereafter, they credited the amount to Government Account by transferring the amount from 'GM PF Account' to 'GM MRO Account' through NEFT/RTGS.

3.2.12 Relevance of the GM PF Accounts

Controller General of Accounts (CGA), Ministry of Finance had launched (August 2012) government e-Payment Gateway for full-fledged electronic payment.

OFs, instead of acting fully on the decision of CGA/CGDA for electronic mode for payment and receipts, continued with their old arrangement simultaneously. They were paying pay allowances directly to the bank Accounts of their employees through e-Payment gateway. The non-salary amount of their employees, however, was still being credited first to Public Fund Accounts and therefrom payments were disbursed after delay.

Audit noticed that there were inordinate delays in depositing Government receipts[70] into Government Account and in making payments to the employees (discussed in details in **Paragraph 3.2.4 & 3.2.6**). The prevailing practice of collection of defence receipts first in "GM's Public Fund Account" and therefrom its remittance to Government Account was fraught with risk of unwarranted amounts lying in the bank accounts for a longer period leading to mala-fide withdrawals.

Audit is of the view that, after implementation of e-Payment Gateway and e MRO for receipt, there was no more necessity for parallel operation of these Public Fund Accounts.

The OFs instead of closing existing PF Accounts, had opened a number of additional bank accounts unauthorisedly over and above one PF Account for each factory. There were number of instances of internal control failures too. On being pointed out by audit, DGOF/Chairman of OF organisation issued orders (March 2019) to all Senior General Managers/General Managers of OFs to take appropriate

[70]The Government's receipts/revenues mainly cover (i) sale proceeds or deposits for products / scrap (ii) charges for utilization of defence assets by the employees i.e. Standard License fees, water/electricity charges, use of community hall, (iii) receipt of security deposits *etc*.

action to operationalise e-Payment and e-MRO fully. It was also ordered to close all additional bank accounts that were opened unauthorisedly.

3.2.13 Internal control failure due to lack of monitoring

Audit noticed various internal control failures due to lack of monitoring as under:

(i) Authority competent to authorise opening of Bank Accounts, if any under special circumstances, was not defined. The modus operandi of opening Public Fund Accounts was also not laid down. Audit examined the information furnished by the factories and found that General Managers of the Factories were, therefore, more liberal in opening of Bank Accounts, wherever they considered necessary**.**

(ii) Chief Internal Auditor (OFs) under the administrative and functional control of the Controller General of Defence Accounts had not pointed out the irregularities in opening a number of Bank Accounts by GMs except once (June 2016)[71]. CIA (OF) did not also raise objection to the remitting of huge amount of fund to PF Accounts by LAOs, even after introduction of CMP.

(iii) Local Accounts Offices were still remitting funds to the PF Accounts, instead of making payments directly to the payees. The office of PCA (Fys) never ascertained as to why LAOs were still remitting fund to PF Accounts after introduction of CMP. They did not ascertain the reasons for holding huge amount of money in the PF Accounts of respective factories at the end of the financial year. This huge amount remains unlinked and non-reconciled as discussed in **Paragraph 3.2.7 and 3.2.8**.

(iv) Local Accounts Offices were delinked from functional responsibility of maintenance of Cash Book of PF Accounts. The Banks were holding huge amount of money due to improper maintenance of Cash Book and defective BRS as discussed in **Paragraph 3.2.7 and 3.2.8**. Local Accounts Offices, who check PF Accounts periodically, did not point out the defects in preparation of BRS and suggest corrective measures.

3.2.14 Conclusion and Recommendations

Ordnance Factories had opened Public Fund Accounts with nationalised Banks for payment and receipt of Government money. A number of these Bank Accounts were opened at factory level without explicit approval of OFB in all cases. Despite having online system (CMP) for payment directly to the accounts of the

[71]On irregular opening of Bank Account for commercial activities by GM, OF Muradnagar. Despite of the objection raised by Chief Internal Auditor (OFs), OF Muradnagar continued to maintain the Bank Account till date as of January 2019**.**

payees, a huge amount of fund was transferred to PF Accounts. This ultimately caused delay in making payments to the payees. Depositing Government receipt into Government Account through e-MRO within T+1 working day was not fully operationalised in all OFs. Accounting and reconciliation of receipts and payments and reporting thereon were not in order for PF Accounts. A considerable amount of Government money remained in float in all Bank Accounts (outside Government Account) due to non-reconciliation over a period of time.

Audit recommends the following:-

- The operations of the GM PF Accounts should be at a minimum where due to logistics issues, it becomes unavoidable. All Bank Accounts over and above the GM PF Accounts should be immediately closed after transfer of the balances to either the Government Treasury or to the GM PF Accounts.
- Local Accounts Office /PCA (Fys) should ensure all online payments directly to the payees' account through SBI CMP. All Factories should immediately operationalise e-MRO for depositing Government receipts into Government Account.
- Accounting and reconciliation procedure between Cash Book and Bank Statement should be streamlined by factory managements. All un-reconciled balance in Bank Accounts should immediately be deposited into Government Account without further delay.
- Investigations into cash defalcation of about ₹6.56 crore at Rifle Factory, Ishapore should be expeditiously completed and appropriate action on defaulters need to be taken. OFB should also ensure that such defalcations have not occurred or are not likely to occur in other Ordnance Factories.
- Payment from GM's PF Accounts in various factories on DA Arrears, OF day, *etc.* is irregular and needs to be curtailed urgently.

3.3 Avoidable extra expenditure of ₹3.27 crore on procurement of Horizontal Machining Centre at Ordnance Factory Kanpur

Ordnance Factory Kanpur did not consider the bid of one firm for procurement of two Horizontal Machining Centre on the ground of ambiguity in the rates quoted against the Tender Enquiry of October 2012. Factory neither sought clarification from the firm nor agreed to the advice of its Account Office for referring the case to OF Board. Instead, it decided to retender the case. The Factory procured the two machines from the same firm in September 2015 by incurring an extra expenditure of ₹3.27 crore, which was clearly avoidable.

Ordnance Factory Kanpur (OFC) issued a Tender Enquiry (TE) in October 2012 for procurement of two machines *viz.* Horizontal Machining Centre (HMC)[72] through e-procurement system. In the 'price bid template' there was a column on "Quantity Required" wherein it was indicated that firm must quote prices for one machine only. In addition, firms were required to specify the detailed break-up of the cost in 'Annexure'.

Two firms *viz.* M/s Jyoti CNC Automation Pvt. Ltd (M/s Jyoti) and M/s Deckel Maho Pfronten GmbH (M/s DMG) quoted their rates against the TE. Tender Purchase Committee (TPC) found that M/s. Jyoti had quoted the price of the basic machine in the 'price bid template' as ₹10.08 crore. In the 'Annexure' attached with the price bid the unit cost of the machine was indicated as ₹5.04 crore. Against this, unit price of M/s DMG was 8.12 lakh Euro (₹6.96 crore @ ₹85.76 per Euro). Therefore, as per 'price bid template' M/s DMG emerged L-1, and as per the 'Annexure' M/s Jyoti became L-1. Due to this ambiguity, TPC decided to retender.

Fresh TE was issued by OFC in January 2014. Both the above firms again quoted their rates against the TE. M/s Jyoti, with unit price of ₹6.67 crore became L-1. Supply order (SO) was placed (September 2015) on the firm with scheduled delivery period of September 2016. Both the machines were received and commissioned in February 2017.

Audit noted the following irregularities in procurement of the above HMC machines:

a) OFB's procurement Manual for Plant & Machinery prescribed the price bid template in which Firm was required to quote the unit price as well as the total price of the machines (quantity x unit price). Audit observed that the column of total price was absent in the price bid template of TE of October

[72]Machining centre with horizontal spindles for manufacturing components of a weapon.

2012. However, subsequently in the retender of January 2014, OFC rectified the price bid template by inserting the total price of all machines required.

b) From the quotes of M/s Jyoti, TPC had noted that the unit price of basic machine in Annexure was half of the price quoted in price bid template. Same was the trend in quotation for other items in the price bid *viz.* fixtures, tooling and accessories. It also observed that the firm had perhaps filled up the price of two machines in the column which indicated that the firm should quote for one machine only. Further, TPC had the details of last purchase price of December 2011, when similar machines were procured from M/s Jyoti at the basic price of one machine as ₹3.45 crore. Moreover, Local Accounts office of OFC had proposed (December 2013) that the matter be referred to OFB to seek clarification as to which document be taken as a base for deciding L-1.

In spite of the above, TPC neither sought clarification from the firm about the ambiguity in quoting two different rates in 'price bid template' and 'Annexure' nor referred the matter to OFB. Instead, it decided (December 2013) for retendering. Due to retendering in January 2014, the same firm (M/s Jyoti) quoted the unit rate of ₹6.67 crore for basic machine. As a result, factory had incurred an avoidable extra expenditure of ₹3.27 crore on procurement of two machines (including fixtures, tooling and accessories) within a span of just over one year. It is also to be noted that against a quote of ₹5.04 crore in December 2012, M/s Jyoti enhanced their bid to ₹6.67 crore in January 2014. The L-2 firm had quoted ₹6.96 crore earlier in December 2012.

On being pointed out in audit, OFB stated (February 2019) that bids were accepted against TE of October 2012 only by electronic mode in e-procurement system. As per price bid format, firms were required to quote for one machine only. However, M/s Jyoti quoted contradictory prices in price bid template and Annexure which created ambiguity in ranking status that led to TPC to decide for retendering. They added that any changes in offer price based on either the price bid template or the annexure after opening of the price bid would have in violation to the TE conditions.

The reply of the OFB was not convincing as the ambiguity between the figures of 'price bid template' and detailed price break-up in the 'Annexure' could have been got confirmed from the firm in the first tender itself. OFC had also acknowledged the deficiency in price bid template which was amended in the subsequent tender of 2014 by specifying that total cost would be of two machines.

The matter was referred to the Ministry in October 2018; their response was awaited as of June 2019.

3.4 Extra expenditure by High Explosive Factory Kirkee due to placement of an order on unqualified firm for supply of a chemical plant

High Explosive Factory Kirkee did not exercise due diligence before concluding a contract (April 2012) for procurement of Ammonium Perchlorate Plant. The selected firm was not technically and financially qualified for this project. The contract was terminated (November 2013) as the firm failed to execute the project. HEF concluded (June 2015) a contract with another firm at a cost of ₹28.50 crore for procurement of the same AP Plant. This resulted in an extra expenditure of ₹1.94 crore besides delay in setting up of the plant.

Ammonium Perchlorate (AP) is one of the main ingredients for manufacture of composite propellant used in Pinaka and other Rockets. High Explosive Factory Kirkee (HEF) concluded (April 2012) a contract with M/s Ogene Hyderabad for design, supply, erection and commissioning of AP plant having capacity of 220 MT on turnkey basis (including associated Civil Works). This was to be done at a cost of ₹22.12 crore with Probable Date of Completion (PDC) as December 2013. However, M/s Ogene failed to meet any of the milestones stipulated in the contract such as submission of design and documents, execution of civil works, ordering of Plant and Machinery, *etc.* even after a lapse of 17 months. Consequently, HEF terminated (November 2013) the contract without any financial commitment and forfeited Performance Security Deposit (PSD) of ₹1.11 crore.

Audit examined the tendering process which showed that HEF had erred in awarding the contract to M/s Ogene as it did not meet the qualifying criteria as per the tender condition. The same is explained below:

Before issue of Tender Enquiry (TE), HEF openly invited (August 2010) application for pre-qualification from reputed Chemical Plant manufacturers with adequate capability and experience. Based on the verification of responses of the vendors, TE were issued (February 2011) to seven vendors and bids were received from three vendors. Of them, two vendors *viz*. M/s Ogene, Hyderabad and M/s Nuberg, Noida were found technically qualified. On opening of price bid M/s Ogene with the offer of ₹22.12 crore emerged[73] L-1 and the contract was signed with the firm in April 2012.

Audit noted that the pre-qualification requirements had stipulated that the vendor should be technically and financially reputed and should have sufficient

[73]M/s Nuberg, Noida was L-2 with the price offer of ₹25.45 crore.

experience in manufacturing and supplying similar equipment on turnkey basis including civil works to the actual users. However, qualifying figures for turnover, income/profit, manpower, *etc*. were not stipulated. Only verifiable criteria was that the applicant should have executed successfully at least one similar plant with minimum value of ₹15 crore and submit its documentary evidence.

Audit observed that in the absence of such qualifying figures, recommendation of the capacity verification team of HEF (February 2011) as well as TPC/HEF (February 2011) about the technical and financial soundness for the proposed plant remained subjective.

M/s Ogene was specialised in area of pharmaceuticals and bio-technology. With respect to successful completion of similar plant with minimum value of ₹15 crore, M/s Ogene had given details of seven projects which, they claimed, were executed/ ongoing in association with another firm *viz.* M/s S S Technomark, Hyderabad. Out of seven projects, only one project[74] met the condition of similar plant with minimum value of ₹15 crore, however, from the details Audit could not ascertain whether the project was successfully completed by M/s Ogene. On pointing out by Audit, HEF sought (February 2019) confirmation from Vikram Sarabhai Space Centre. This indicates that the status about the execution of the plant was not ascertained by HEF before recommending the firm for issue of TE.

Audit also noticed that turnover of M/s Ogene was only ₹3.01 crore and ₹18.53 crore during 2008-09 and 2009-10 respectively. The firm had even delayed giving 5 *per cent* security deposit after signing of the contract in April 2012. The reason for the delay was that the firm found it difficult to get requisite Bank Guarantee due to insufficient fund.

Thus, there was a failure on the part of HEF in assessing the technical and financial soundness of the firm M/s Ogene before entering into contract with them. Had HEF exercised the due diligence before signing the contract, an extra expenditure to the tune of ₹3.05 crore could have been avoided.

OFB, in its reply, stated(February 2019) that M/s Ogene was considered qualified for issuing TE as M/s Antrix[75] had recommended the name of M/s Ogene as potential vendor for the project and the firm had completed three projects of valuing more than ₹19 crore.

[74]Design and Engineering and installation and operate of 1000 TPA plant (Hydro Carbon fuel equivalent Rocket grade propellant) at Vikram Sarabhai Space Centre, Thiruvananthapuram.
[75]The project at HEF was considered with the technology provided by M/s Antrix Corporation, a Government organization under the administrative control of Department of Space.

OFB's reply is not convincing since Antrix had advised the name of M/s Ogene as one of the potential vendors before pre-qualification stage. Assessment of capacity of the firms and selection of technically and financially competent firm was the responsibility of the Factory. Further, the reply of OFB that firm had completed three projects valuing more than ₹19 crore is not correct as stated earlier in the paragraph.

HEF issued another TE for procurement of AP Plant against which lowest offer of ₹31.23 crore from M/s Nuberg Noida was received. After price negotiation, HEF concluded (June 2015) a contract with M/s Nuberg for the same at a cost of ₹28.50 crore with PDC as September 2016. The cost of the contract was more than the cost of the cancelled contract with M/s Ogene by ₹3.05 crore. The Plant was received between January 2016 and June 2017 and was under commissioning as of July 2018. An amount of ₹20.80 crore had been paid to M/s Nuberg Noida.

Thus, the placement of contract on technically and financially incompetent firm M/s Ogene Hyderabad resulted in cancellation of the contract and an extra expenditure of ₹1.94 crore[76] on subsequent procurement of AP Plant at HEF Kirkee.

The matter was referred to the Ministry in January 2019; their response was awaited as of June 2019.

3.5 Loss of ₹62.10 crore on replacement of defective ammunition to Army by Ordnance Factory Badmal

Ordnance Factory, Badmal (OFBL) supplied Army two types of 155mm ammunition in March 2009 and March 2010 respectively. Army reported exudation of TNT mix explosives from the shells of ammunition within their shelf life. This was on account of lower set point (melting point) of TNT than the specified range. Required test of set point value of TNT in TNT mix were not carried out at OF Badmal before filling in shell due to absence of provision for such testing in the CQA's specification.
CQA (ME), Pune had stated (May 2017) that by not mentioning set point clause in the specification does not mean to refrain from set point testing of TNT mix. CQA was silent on how, despite having no such checks by the Factory, its quality assurance establishment (SQAE) cleared the ammunition during surveillance check.
Finally, lack of availability of test provision for set point of TNT mix led to a loss of ₹62.10 crore on account of replacement of defective ammunition by the OFB.

[76] ₹3.05 crore – ₹1.11 crore forfeited by cancelling earlier order of April 2012.

Ordnance Factory, Badmal (OFBL) is a filling factory of 155mm artillery ammunition. In manufacturing of the ammunition, Tri Nitro Toluene (TNT) is used as explosive. OFBL receives TNT (special grade) as input from High Explosive Factory (HEF), Kirkee. TNT (special grade) is mixed with other additives[77] at OFBL before filling shells of the ammunition.

OFBL had issued (March 2009 and March 2010) 155mm ammunition[78] to Army at a cost of ₹43.62 crore and ₹16.53 crore respectively. Central Ammunition Depot (CAD), Pulgaon was the consignee depots for storage of ammunitions from where certain quantity of ammunition was sent to other Field Ammunition Depots (FADs). The ammunitions were issued after quality check by Quality Control Cell of OFBL and quality audit & surveillance check by Senior Quality Assurance Officer (Ammunition) Badmal under DGQA.

In April 2014, exudation from shells of the ammunition was reported by FAD, Jodhpur. Joint Inspection (JI) was carried out (December 2014) by the representatives of Army, Factory and SQAE which reported exudation of TNT in seven lots of ammunition. Chemical analysis of exudative shells by Controllerate of Quality Assurance (Military Explosives), Khadki (Pune) revealed (June 2017) that exudation was due to low purity of TNT with set point (melting point) below 80.6^0 C[79] and higher vacuum stability than the prescribed range[80]. CQA (A)[81] Khadki, therefore, sentenced (March/ December 2017) total 21,259 quantity of both types of ammunition as unserviceable.

Indent issued (October 2008) by Army contained a condition that in case the ammunition failed to perform as per the specification during the shelf life (15 years) or reported defective, the supplier (OFB) would either rectify or replace the same free of cost. Accordingly, OFB agreed (June/July 2018) to give free replacement 14,159 ammunition to Army. Ammunition were replaced by OFBL by March 2019. The financial involvement for total replacement would be about ₹62.10 crore[82] at the issue price of 2018-19.

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[77]Para Nitro Toluene (PNT), Hexa Nitro Stilbene (HNS), Nitro Cellulose (NC)

[78]13946 numbers of 155 mm ERFB-BT in March 2009 and 7984 numbers of 155 mm HE M107 in March 2010

[79]Set point was recorded 79.7^0 C in respect of ammunition A and from 79.5^0 C to 80.1^0 C in respect of ammunition B. TNT of low purity has lower set point which has a property of exudation. This can be minimized by using TNT of higher purity with set point 80.6^0 C and above

[80]Vacuum stability was recorded 2.4 to 2.7 against maximum 2.0 ml

[81]The Controllerate of Quality Assurance (Ammunition), the Authorized Holder of Sealed Particulars (AHSP) for ammunition

[82]9331 Shells multiplied by issue price ₹50000 *per* shell = ₹46.65 crore + 4828 shells multiplied by issue price ₹32000 *per* shell = ₹15.45 crore. Sum total ₹62.10 crore.

Audit noted that there were two separate testing specifications; one for TNT special grade (JSS: 1376-02-2012) and other for TNT mix (IND/ME/961:2016). As per first specification, the set point value of TNT Special Grade used for filling of ammunition was 80.6^0 C and above. OFBL accepted special grade TNT from High Explosive Factory (HEF), Kirkee on the basis of Inspection Note/Quality Assurance Certificate received along with the consignment**.** However, the specification for TNT mix did not stipulate any provision to measure set point in TNT mix. Accordingly, OFBL as well as QA authority did not carry out any inspection on TNT set point in TNT mix before filling operation.

OFB, while accepting the audit observation, stated (February 2019) that set point value of TNT special grade received from HEF, Kirkee was not checked at OFBL since it was being supplied after inspection of resident SQAE (A) of HEF. However, after receiving customer complaint of TNT exudation, the set point value of TNT is being checked at OFBL also since December 2016. Regarding testing of set point of TNT mix, OFB stated that there was no specified method for testing of set point of TNT mix in the CQA's specification.

Audit, however, noted that CQA (ME), Pune had stated (May 2017) that by not mentioning set point clause in the specification does not mean to refrain from set point testing of TNT mix. CQA was silent on how, despite having no such checks by the Factory, its quality assurance establishment (SQAE) cleared the ammunition during surveillance check. Further, OFB could not establish that non-checking of TNT (special grade) after its receipt from HEF, Kirkee was the reason behind lower set point of TNT mix.

Thus, in production of 155mm ammunition, provision for measuring set point of TNT mix, in CQA's specification was absent. This had resulted in issue of substandard ammunition to Army. This led to a loss of ₹62.10 crore at OFBL on free replacement of defective ammunition to Army.

Further, TNT is highly inflammable chemical; its exudation had primarily caused major fire accidents at CAD, Pulgaon in 2016. It is recommended that both the Factory and DGQA should resolve the testing methods of such highly inflammable materials and fix responsibility for deviation from standard specifications.

The matter was referred to the Ministry in January 2019; their response was awaited as of June 2019.

3.6 Injudicious procurement of shell filling machine at a cost of ₹21.46 crore at Ordnance Factory Chanda

Improper assessment of available filling capacity of 130mm RVC/FVC ammunition *vis-a-vis* Army's requirement led to injudicious procurement of one Screw Filling machine at OF Chanda. The machine was received in January 2017. Further, the preparatory civil works related to construction of building could not be completed as of December 2018.

The machine was commissioned in December 2017 in another production shop engaged in the pour filling of 105 mm ammunition. This was done despite supplier's advice against commissioning of the machine in the hazardous atmosphere of pour filling.

The machine valuing ₹21.46 crore has thus remained idle since its commissioning in December 2017, as there was no workload.

OF Chanda (OFCH) proposed (June 2010) to procure a Screw Extrusion[83] Filling Plant to augment the existing filling capacity of 130mm RVC/FVC[84] shells. In the proposal, it was stated that as per Army's five year Roll-on-Indent for the period 2009-10 to 2013-14, required annual filling capacity of 130mm shells was 'X' whereas the existing capacity of the factory was 1,05,600 per annum. OFCH also proposed (April 2011) for construction of building to house the new Screw Filling Machine.

OFB approved the proposal for procurement of one Screw Filling Machine in April 2011. After completion of tendering process, it was forwarded (November 2013) to Ministry for CFA approval. Approval of MoD was obtained in May 2015. Accordingly, the factory issued supply order (May 2015) on a foreign firm for procurement of one Screw Filling Machine at a cost of Euro 23.50 lakh. The scheduled delivery period was of 13 months *i.e.* by June 2016. OFB also issued (May 2016) Administrative Approval to Chief Engineer (Fys) Hyderabad for construction of Shell filling building at an estimated cost of ₹12.64 crore with PDC of 104 weeks, *i.e.*, 2 years to be completed by May 2018.

The machine was received in the factory in January 2017. However, by that time, even building plan for construction of the new Shell Filling building was yet to be finalised by OFCH. Filling machine was commissioned in December 2017 in another building at a separate unit[85] after modification at a cost of ₹4.54 lakh. The machine was brought on charge at a cost of ₹21.46 crore.

[83]Screw extrusion the technology of forcing a material through an item by turning screw.
[84]RVC stands for Reduced Variable Charge and FVC stands for Full Variable Charge permitting the adjustment of propellant charges in the cartridges as pre-requirement.
[85]Filling shop for 105mm Shell through pour filling method.

Audit observations on the above are following:

1. Audit noted that in addition to OFCH, OF Badmal (OFBL) was also engaged in production and filling of 130mm RVC/FVC ammunition. At OFCH, filling of this ammunition was being done by screw filling method whereas at OFBL, the same was done by hand filling method (pour filling). The annual filling capacity of these two factories were 1,20,000 and 1,18,000 respectively. Thus, Army's annual requirement of 'X' shell filling was within the combined capacity of OFCH and OFBL.

Army's requirement *vis-à-vis* OFB's targets given to these two factories during the period 2009-10 to 2013-14 are depicted in **Table-24** below:

Table-24: Showing Army's requirement *vis-à-vis* OFB's target of 130mm ammunition

Year	2009-10	2010-11	2011-12	2012-13	2013-14	Total
Army's requirement						
OFB's target to OFCH	60000	100000	102000	106000	88500	456500
OFB's target to OFBL	0	50000	50000	60000	36000	196000
OFB's total target	60000	150000	152000	166000	124500	652500
Total Production	42712	121575	158406	131141	97793	551627

It could be seen from the above that Army's requirements could be met with existing capacity of the factories as is evident from the targets given to them in respective years. Shortfalls in filling of shells, however, were due to less availability of one of components *i.e.* fuze. Thus, in assessing the requirement of the new screw filling machine, OFCH/OFB did not consider the filling capacity of 130mm RVC/FVC available with OFBL.

Audit also noted that, in July 2013, Army had indicated reduction in their requirement of 130mm RVC/FVC for the next five years *viz*. 2014-15 to 2018-19. The revised annual requirements of Army were in the range of 'Y' to 'Z'. Thus, before placement of supply order for new filling machine, OFB was aware about the reduced requirement of Army. The same was perhaps not considered by OFB and proposal for new machine was forwarded to MoD (November 2013) for CFA approval.

2. OFB's circular (December 2009) stipulated that preparatory civil works for erection of machine must be planned well in advance and executed before receipt of plant and machinery to avoid delay in erection and commissioning.

Audit examined that sequence of events leading to sanction and execution of both procurement of Screw Filling machine and associated civil works. The chronology of events has been depicted in **Table-25** below:

Table-25: Sanction and execution of procurement proposals

Particulars/ Events	Demand submitted to OFB	Ministry/ OFB's approval	Placement of SO/WO	Status
Screw Filling Machine	June 2010	May 2015	May 2015	Received in January 2017 and commissioned in December 2017
Screw Filling Building	April 2011	May 2016	Not done	Soil survey was done in July 2017, Building plan finalised by Factory in January 2018 and tender for execution of work yet to be issued as of December 2018

As could be seen from the above, OFCH issued supply order (May 2015) for procurement of the screw filling machine without finalising the work order for construction of the new shell filling building where the machine was to be installed. The building plan was approved by the factory in January 2018 and tendering action for execution of the civil works was not yet (December 2018) finalised by the MES. There was delay in issue of Admin Approval by OFB for five years (April 2011 to May 2016) and subsequent approval of the building plan by OFCH for another 19 months (June 2016 to January 2018). Thus, there was no synchronisation between the activities relating to procurement of the machine and its related civil works.

Audit further noted that due to non-availability of the proposed building, Factory suggested to the foreign firm (supplier) for commissioning of the machine at an alternate location where pour filling of 105mm shell was being carried out. In response, the supplier had stated (July 2017) that they would not provide guarantee for the safety of the screw filling machine as the operation of screw filling is not compatible with the hazardous atmosphere created during the process of pour filling. Ignoring the firm's advice, the machine was commissioned (December 2017) at the location where pour filling machines were already installed. This indicates that the Factory violated safety norms while commissioning the machine at an alternate location.

Audit also noticed (July 2018) from log book of the machine that the new screw filling machine has never been in use since its commissioning in absence of work load.

In response to Audit observation on non-consideration of filling capacity of OFBL, OFB stated (July 2018) that at present Army is insisting for screw filling instead of pour filling of 155mm/105mm ammunition. OFCH has one screw filling and one pour filling plant. OFCH was sanctioned new machine to do screw

filling only. It further stated that OFBL depends on pour filling only and procurement action for one new screw filling machine was under progress.

Reply of OFB is not tenable as filling of 130mm shell at OFCH is done by screw filling only and the new machine was also procured for filling of 130mm shells. The utilisation of the machine for filling of 155mm/105mm ammunition is only an afterthought which will require complete set of exchangeable parts at additional cost. If Army's insistence for screw filling is the reason behind the procurement of new machine, the same should have been done for OFBL where there is no such facility at present.

Regarding construction of new building for commissioning of machine, OFB stated that the existing buildings met the purpose and new building construction was not economical/ required. However, audit noted that OFB was yet to cancel the sanction/Admin Approval for construction of Shell filling building. Further, as commented earlier in the Paragraph, the supplier had objected to installation of new machine in the existing shop due to hazardous condition of pour filling process.

Thus, procurement of filling machine at a cost of ₹21.46 crore by OF Chanda was injudicious as Army had reduced their requirement of 130mm ammunition. The machine remained idle since its commissioning in December 2017.

The matter was referred to the Ministry in November 2018; their response was awaited as of June 2019.

N. Munshi

Kolkata
Date : 7th November, 2019

(NANDANA MUNSHI)
Director General of Audit
Ordnance Factories

Countersigned

New Delhi
Date : 18th November, 2019

(RAJIV MEHRISHI)
Comptroller and Auditor General of India

ANNEXURE-I

(Referred to in Paragraph 1.2 and 1.2.5)

Details of Cost of Production and Value of Issues

(₹in crore)

	M&C	WV&E	A&E	AV	OEF	Total
Cost of Production						
2013-14	2,286.95	3,655.37	5,517.54	2,930.54	1,246.27	**15,636.67**
2014-15	2,518.20	4,084.51	6,017.46	2,536.31	1,319.25	**16,475.73**
2015-16	2,740.60	3,897.10	6,844.32	3,294.47	1,517.58	**18,294.07**
2016-17	2,748.20	4,515.26	6,494.95	4,635.88	1,642.50	**20,036.79**
2017-18	2,471.63	4,287.69	6,709.22	5,072.57	1,586.04	**20,127.15**
Value of Issue						
2013-14	2,382.40	3,966.44	5,584.44	2,926.91	1,261.91	**16,122.10**
2014-15	2,676.65	3,937.18	6,128.84	2,519.04	1,402.66	**16,664.37**
2015-16	2,896.31	3,953.51	6,961.70	2,949.83	1,862.59	**18,623.95**
2016-17	2,961.09	4,683.24	6,630.65	4,374.88	2,226.67	**20,876.13**
2017-18	2,535.51	4,171.51	6,652.99	5,166.16	1,783.46	**20,309.63**
Breakup of cost of 2017-18 (with % of COP)						
Material	949.97	2,015.41	3,863.83	3,422.51	630.56	**10,882.28**
	(38.43%)	**(47.00%)**	**(57.59%)**	**(67.47%)**	**(39.76%)**	**(54.07%)**
Labour	342.68	532.56	629.44	414.63	415.78	**2,335.09**
	(13.86%)	**(12.42%)**	**(9.38%)**	**(8.17%)**	**(26.21%)**	**(11.60%)**
Direct Expense	130.22	52.50	91.85	62.94	8.23	**345.74**
	(5.27%)	**(1.22%)**	**(1.37%)**	**(1.24%)**	**(0.52%)**	**(1.72%)**
FOH	832.56	1,314.15	1,830.88	920.28	429.97	**5,327.84**
	(33.68%)	**(30.65%)**	**(27.29%)**	**(18.14%)**	**(27.11%)**	**(26.47%)**
VOH	216.20	373.07	293.22	252.21	101.50	**1,236.20**
	(8.75%)	**(8.70%)**	**(4.37%)**	**(4.97%)**	**(6.40%)**	**(6.14%)**
Total	**2,471.63**	**4,287.69**	**6,709.22**	**5,072.57**	**1,586.04**	**20,127.15**
Inventory position						
Stores in hand	631.24	1555.32	2,967.50	2,229.00	183.38	**7,556.44**
WIP	390.56	922.06	1,768.50	1,474.30	92.97	**4,648.39**
Finished Stock	315.81	430.26	271.68	578.74	90.59	**1,687.08**
Stores in transit	58.02	147.22	568.22	71.63	1.80	**846.89**
Total	**1,395.63**	**3,054.86**	**5,575.90**	**4,353.67**	**368.74**	**14,748.80**
Source : Annual Accounts of the Ordnance Factories for the year 2013-14 to 2017-18						

ANNEXURE-II

(Referred to in Paragraph 1.4)

Status of projects for creation/augmentation of production capacity in Ordnance Factories

Sl. No	Name of the Project	Date of Sanction	Original PDC	Revised PDC	Sanctioned Cost / Revised Cost (₹in crore)	Expenditure incurred (upto March 2018) (₹in crore)
1.	Augmentaion of production capacity of engine to 750 nos at Engine Factory, Avadi& OF, Medak	August 2010	March 2013	June 2019	351	202 (58 %)
2.	Augmentation of capacity for production of spares require for O/H of T-72 & T-90 tank at HVF and T-72, T-90 & BMP-II Engines at EFA	October 2010	December 2013	October 2019	368	222 (60 %)
3.	Creation/Augmentation of large Calibre Weapon manufacturing capacity at MSF, GCF,FGK & OFC	March 2012	March 2015	December 2020	377	229 (61 %)
4.	Creation of facilities for augmentation of production of Pinaka Rocket from 1000 to 5000 nos per annum at OFAJ, HAPP, MPF, MSF, OFBH, OFC, OFI, OFDR & OFCH	April 2013	October 2015	April 2019	1389	695 (50 %)
5.	2 lakh Bimodular Charge System (BMCS) at OF Nalanda	November 2001 February 2009 (revised)	November 2005	March 2019	941	671 (71%)
6.	T-90s (HVF, EFA, OLF, OF Medak)	December 2013	December 2017	Project completed physically.	96	96 (100%)
7.	Production of 50 nos of T-72 variants (HVF)	August 2010	March 2013	September 2019	280	196 (70 %)
8.	Augmentation of Production Capacity of T-90 Tanks from 100 to 140 nos p.a. (HVF, EFA, OLF & MTPF)	September 2011	March 2014	January 2021	971	309 (32 %)
9.	Setting up of HMX Plant of capacity 45 MT p.a. with associate civil works	March 2012	February 2016	August 2018	60	51 (85%)
10.	Augmentation of Stand by NG (Nitro glycerine) Manufacturing Plant (OF Itarsi)	January 2018	October 2010	Commissio -ned in May 2018	39	33 (85%)

Sl. No	Name of the Project	Date of Sanction	Original PDC	Revised PDC	Sanctioned Cost / Revised Cost (₹in crore)	Expenditure incurred (upto March 2018) (₹in crore)
11.	Akash missile Propellant Augmentation Project 500 Nos/ Annum	December 2011	March 2014	October 2019	106	15 (14%)
12.	Creation of facilities for productionalisation of Pinaka Rocket at Ordnance Factories (OFAJ, OFC, OFPM)	May 2007	May 2010	Project completed physically.	107	67 (63%)
13.	Augmentation of Capacity for manufacture of Mine Protected Vehicle 300 p.a. at VF Jabalpur	September 2010	June 2013	September 2018	48	19 (39%)
14.	O.F. Korwa Project [OF(P) Kor]	October 2007	October 2010	December 2017	408	300 (74 %)
15.	Setting up of Ammonium Perchlorate (Special Chemical) plant at HEF of capacity 220 MT/Annum on turnkey basis	November 2010	July 2012	September 2018	26	20 (77%)

ANNEXURE-III

(Referred to in Paragraph 1.5)

Position of outstanding ATNs

Sl. No.	Report No. & Year	Para No.	Subject
1.	15 of 2017	7.4 **	Management of Manufacture Warrants
2.	8 of 2018	Chapter-I **	Performance of Ordnance Factory Board
3.	8 of 2018	Chapter-II ***	Quality management in Ordnance Factories dealing with Ammunition & Explosives
4.	8 of 2018	3.1 ***	Production of Parachutes in Ordnance Factories
5.	8 of 2018	3.2 *	Production of Pinaka Rockets in Ordnance Factories
6.	8 of 2018	3.3 ***	Stores-in-Transit between Ordnance Factories
7.	8 of 2018	3.5 *	Blocking of funds of ₹14.30 crore due to non-utilisation of boiler house

*** ATN examined by Audit but yet to be revised by the Ministry in the light of Audit remarks – 02**

**** ATNs vetted by Audit but finalised ATNs are awaited from Ministry – 02**

***** ATN not received even for the first time – 03**

ANNEXURE-IV

(Referred to in Paragraph3.2.8)

Factory wise discrepancies between Cash Book and Bank Statements

(Amount ₹in crore)

	Not the reasons for discrepancy as amount entered in Cash Book and also in Bank Statement before 31 March 2018[86]				**Time gap in making entry in Cash Book and Bank Statement and amount thereof**				**Non-linked cases and amount thereof as on 31 October 2018**			
	No. of Factories	**No. of cases**	**Amount**	**Time taken to link**	**No. of Factories**	**No. of cases**	**Amount**	**Time taken to link**	**No. of Fys**	**No. of cases**	**Amount**	**Remain unlinked**
Receipt shown in Cash Book but not in Bank Statement	07	347	28.29	2 to 532 days	04	44	3.06	3 to 240 days	02	113	1.18	Since November 2003 and January 2011 at AFK.
Deposits shown in Bank Statement but not in Cash Book	04	05	1.36	4 to46 days	14	690	69.02	1 to 1897 days.	12	443	7.57	210to 1454 days[87]
Withdrawal shown in bank Statement but not in cash book	06	142	16.21	2 to 75 days	01	3	0.0001	23 to 27 days.	03	73	0.03	216 to 233 days [88]
Withdrawal shown in Cash Book but not shown in Bank Statement	04	25	1.95	2 to 14 days	11	416	18.03	1 to 412 days	03	5	0.0045	226 to 325 days
Total	**21**	**519**	**47.81**		**30**	**1153**	**90.11**		**20**	**634**	**8.78**	

[86]All these cases were already entered both in bank column of Cash Book and also in Bank Statement within 31 March 2018. Hence, these cases could not be considered as reasons for discrepancy between year-end cumulative balance of Cash Book and Bank Statement as on 31 March 2018. BRS Preparation was therefore not in order.
[87]Includes ₹28.83 lakh (177 cases) remained unlinked since November 2003 to February 2012.
[88]Includes ₹2.91 lakh (20 cases) remain unlinked since November 2004 to September 2010.

Appendix-I

List of Abbreviation

		A
AFK	**:**	Ammunition Factory Kirkee
AHSP	**:**	Authority Holding Sealed Particulars
AMR	**:**	Anti-Material Rifle
AO	**:**	Accounts Office
AP	**:**	Ammonium Perchlorate
AQL	**:**	Acceptable Quality Level
APR	**:**	Annual Provision Review
ATN	**:**	Action Taken Note
		B
BEL	**:**	Bharat Electronics Limited
BPC	**:**	Bulk Production Clearance
		C
CAD	:	Central Ammunition Depot
CFA	:	Competent Financial Authority
CP	**:**	Control Points
CPE	**:**	Central Proof Establishment, Itarsi
CQA(A)	**:**	Controllerate of Quality Assurance (Ammunitions)
CQA(ME)	**:**	Controllerate of Quality Assurance (Military Explosives), Kirkee
		D
DADOM	**:**	Defence Accounts Department Office Manual
DD	**:**	Detonating Device
DEITY	**:**	Department of Electronics and Information Technology
DGAQA	**:**	Director General of Aeronautical Quality Assurance
DG NAI	**:**	Directorate General of Naval Armament Inspection
DGOF	**:**	Director General, Ordnance Factories
DGQA	**:**	Director General of Quality Assurance
DI	**:**	Defect Investigation
DP	**:**	Delivery Period
DP Test	**:**	Dye Penetration Test
DRDO	**:**	Defence Research & Development Organisation
		E
ECIL	**:**	Electronic Corporation of India Limited
EMD	**:**	Earnest Money Deposit
EPD	**:**	Electronic Point Detonation
ERP	**:**	Enterprise Resource Planning
		F
FAD	:	Field Ammunition Depot
FAI	**:**	Final Acceptance Inspection
FMC	**:**	Fuze Mine Combination

FRB	**:**	Failure Review Board
FVC	**:**	Full Variable Charge
		G
GFR	**:**	General Financial Rules
GSF	:	Gun & Shell Factory Cossipore
GM	:	General Manager
GSQR	:	General Staff Qualitative Requirements
GTE	**:**	Global Tender Enquiry
		H
HE	:	High Explosive
HEAT	:	High Explosive Anti-Tank
HEF	:	High Explosive Factory
		I
IFD	**:**	Inter Factory Demand
IFG	**:**	Indian Field Gun
		J
JI	**:**	Joint Investigation
		L
LPR	**:**	Long Proof Range, Khamaria
LTE	**:**	Limited Tender Enquiry
		M
MED	:	Micro Electronic Detonator
MES	:	Military Engineer Services
MHA	:	Ministry of Home Affairs
MIS	**:**	Material Inward Slip
MOD	**:**	Ministry of Defence
		N
NABL	**:**	National Accreditation Board for Testing and Calibration Laboratories
NOC	**:**	No Objection Certificate
		O
OEM	**:**	Original Equipment Manufacturer
OFAJ	**:**	Ordnance Factory Ambajhari
OFB	**:**	Ordnance Factory Board, Kolkata
OFBL	**:**	Ordnance Factory Badmal
OFC	**:**	Ordnance Factory Kanpur
OFCH	**:**	Ordnance Factory Chanda
OFDC	**:**	Ordnance Factory DumDum
OFDR	**:**	Ordnance Factory DehuRoad
OFB PM	**:**	Ordnance Factory Board Procurement Manual (Stores)
OTE	**:**	Open Tender Enquiry

		P
PDC	:	Planned Date of Completion
PFFC	:	Pre Formed Fragmented Cubes
PPP	:	Public Private Partnership
PSD	:	Performance Security Deposit
PWP	:	Plasticized White Phosphorous
PXE	:	Proof and Experimental Establishment, Chandipore
		Q
QA	:	Quality Assurance
QAP	:	Quality Assurance Plan
QC	:	Quality Control
QIN	:	Quality Improvement Note
		R
R&D	:	Research and Development
RFP	:	Request for proposal
RFR	:	Returned for Rectification
RVC	:	Reduced Variable Charge
RSA	:	Republic of South Africa
		S
SAD	:	Safety and Arming Device
SAP	:	Systems Applications and Products
SDOTE	:	Source Development Open Tender Enquiry
SHIS	:	Store-Holders' Inability Sheet
SLA	:	Safety Lock Assembly
SOP	:	Standard Operating Procedure
SP	:	Surveillance Points
SQAE	:	Senior Quality Assurance Establishments
STE	:	Single Tender Enquiry
		T
TEC	:	Technical Evaluation Committee
TFM	:	Target Fixation Meeting
ToT	:	Transfer of Technology
TPC	:	Tender Purchase Committee
		U
UAR	:	Unavoidable Rejection
		W
WIP	:	Work-in-Progress

Appendix-II

Glossary of Terms

Authority Holding Sealed Particulars	Agency holding sealed designs and specifications after development of a new item and its acceptance by the users. The AHSP prescribes the process and proof schedule for manufacture, quality control and quality assurance. It forms the basis for product specific Quality Assurance Plan.
Acceptable Quality Level	It is the maximum percent defective (or the maximum number of defects per hundred units) that, for purposes of sampling inspection, can be considered satisfactory as a process average.
Blinds	Fuze fails to transmit detonation wave to shell resulting non-functioning of the ammunition. Hence, no smoke or flash is observed on or after impact of the Fuze with target.
Bulk Production Clearance	Bulk Production Clearance is given by the user for any new item to be manufactured by Ordnance Factories after successful trial evaluation.
Control Point Checks	Sample checks at important points in manufacturing process to ensure specified quality parameters of the items under manufacture. Items are subjected to next operation only after clearance in a particular control point check.
Defect	A defect is a departure of a quality characteristic from its intended level or state that occurs with a severity sufficient to cause an associated product or service not to satisfy intended normal or reasonably foreseeable usage requirement.
Detonating Device	A mechanical or electrical explosive device with a small amount of explosives which can be used to initiate the reaction of a disrupting explosive.
Indent	Formal order from user (Army/Air Force/Navy) on Ordnance Factory Board for Arms, Ammunitions, Tanks, General Stores, *etc.*
Inter Factory Demand (IFD)	Order placed by one Ordnance Factory on another Factory for various components/materials required for finished products.
Dynamic Proof	The dynamic proof of the ammunition stores is carried out under extreme climatic and weapon conditions to ensure that ammunition issued to the user is serviceable and fit for use even in worst service conditions.
Material Inward Slip (MIS)	Document for recording material received ex-trade in Ordnance Factories.
Piezo Generator	It is the nose part of fuze B-15. It consists of a piezo crystal which is placed on a contact between the Phenolic moulding materials of body with contact. A steel striker and nut are placed on top of the piezo crystal and is enclosed by a ballistic cap.
Premature Functioning	Functioning of fuze either inside the bore of the gun or at the muzzle or in trajectory within the specified safety distance.
Proof Schedule	Description of methodology, parameters, criteria, sampling plan for proof test firing of Ammunition items.
Pull-off Test	Proof performance test of fuze after removal of Safety Pins by applying a pull of 13.5N to Ring Release Pin for non-functioning and repetition of the same test on the same fuze by applying a pull of 45N for functioning.

Quality Assurance	This is second tier quality checks carried out by SQAE attached to each factory under DGQA.
Quality Assurance Plan (QAP)	The Quality Assurance Plan describes the strategy and methods the project will deploy to ensure two things: • That the project is being managed, developed, and deployed in a sound, reasonable way. • That the project's deliverables are of acceptable quality before they are delivered to the project's clients. QAP of ammunition includes brief description, technical specifications, list of drawings, bill of materials, Acceptance/Performance test, quality audit points/checks/methodology, operational checks/tests, *etc.*
Quality Control	A section of the factory where first tier quality checks are done before submission to DGQA Authority.
Quality Improvement Note (QIN)	Issued by Quality Assurance Organisation to Factory management suggesting measures for quality improvement.
Request for proposal (RFP)	Document which solicits proposal, often made through a bidding process, by an agency or company interested in procurement of a commodity or service, to potential suppliers to submit business proposals.
Returned for Rectification (RFR)	Finished product not accepted in Factory's quality control inspection but rectifiable is termed as returned for rectification.
Roll-on-Plan	Army's plan which projects the multi-year requirement indicating minimum essential requirement based on trends in wastage.
SHIS	Document prepared by the Store holder to report his inability to supply a store when the stock has gone below a fixed limit, so that arrangements may be made for replenishment. It show stock in hand, due, average consumption, inabilities in sight and requirements to meet liabilities.
Static Proof	Static Proof is carried out on components of Ammunition stores in order to check that the Ammunition is capable to withstand the fatigue during transportation, handling and storage condition. Static proof of components is done with restricted amount of explosive both at empty and filled stages of an ammunition lot. After successfully passed this stage they are permitted for gun proof.
Surveillance Point Checks	Surveillance point checks are to be carried out at any stage throughout the production line other than that covered under CP to identify discrepancies and check unexpected trend, results of which to be submitted to the Factory for information and necessary action.
Tender Purchase Committee	For all purchases of stores more than ₹10 lakh, a TPC of appropriate level is formed to scrutinize the tender received and to recommend the name of vendor for supply of stores.
Unavoidable Rejection (UAR)	Admissible rejection in manufacture of any item as indicated in the estimate of that particular item.