

Chapter VII: Quality Control and Quality Assurance

Audit objectives

Whether adequate quality control mechanism was in place for input materials and finished products, and the existing controls were efficient and effective to ensure delivery of products conforming to the requisite quality.

Source of audit criteria

- *Standard Operating Procedure for inspection of input materials and*
- *Norms of rejection at factory end as well as proof rejection by the Quality Assurance Establishments.*

7.1 General

Ordnance factories follow a system of multilayer inspection, quality control and quality assurance before issue of final products to the Services. The responsibility of inspection of input materials and stage/inter-stage inspection of components/assemblies in the manufacturing process rests with the Quality Control section of the factory. Quality assurance of the end products before issue to the Services is the responsibility of the DGQA organisation. Thus, OEFG and DGQA are jointly and severally responsible for ensuring that the Services receive quality items. Flow chart of activities relating to quality control and assurance is depicted in **Annexure-III**.

We observed inadequate inspection at various stages, repeated rejections and frequent customer complaints as discussed in the subsequent paragraphs.

7.2 Inadequate inspection of input materials procured from trade

Paragraph 1.4 of Standard Operating Procedure (SOP) of OFB stipulates that all materials need to be inspected within 15 days from the date of receipt in the factory. Individual factories under OEFG have fixed different benchmark for minimum time required for inspection as 10 to 15 days for the materials required for manufacturing parachutes and uniforms. As an exception, OCFA has fixed the benchmark of minimum time as 18 to 26 days. As per Paragraphs 2.1 and 2.5 of SOP, the Quality Control officer is required to carry out visual and dimensional inspection of input materials with reference to the relevant product specification and drawings, by drawing samples as per the standards and the sampling plan and forwards the samples to its own/NABL accredited laboratory, wherever warranted. The Inspection Officer is required to obtain comments of acceptability from the concerned production section, if required, before final acceptance of the material or otherwise.

We observed that the factories did not adhere to the norms of minimum time required for inspection and took less time in inspection of input materials and passed various fabric and miscellaneous items on the day of their receipt, particularly on 31 March every year as detailed in Table-30.

Table-30: Instances of inadequate inspection

Factory	Inspection on the same day of receipt		Inspection in less time than the minimum time required			Remarks
	No. of cases	Value (₹ in lakh)	Time taken	No. of cases	Value (₹ in lakh)	
OEFC	49	767.63	1-5 days	40	433.78	Test check applied on small sample
OPF	14	57.32	1-5 days	150	224.57	- do -
OCFS	2	1.06	1-6 days	19	63.87	- do -
OCFA	11	109.01	1-17 days	2170	137.09	Data extracted from sample of 3787 records
OEFH	22	98.03	1-5 days	731	609.56	Test check applied on small sample

Thus, the inspection of input materials in less time compared to the minimum time required as well as on the same day of their receipts was deficient and inadequate.

The Ministry stated that the materials were cleared as per procedure giving adequate time for testing/quality check and quality was not compromised. The contention is not acceptable since actual time taken for inspection (1 to 6 days) was less than the minimum time required (10 to 15 days) thereby compromising the quality of input materials as discussed in the Paragraphs 7.2.1 and 7.3.

7.2.1 Inspection of input material before actual receipt

We observed specific cases where the despatch challan dates of the suppliers were same as that of receipt, inspection and acceptance date (mainly 31 March 2010 and 2011) indicated by the factories. Since the firms were situated in Mumbai, Bhilwara, Phagwara, Faridabad *etc.*, far away from those factories, it is obvious that inspection was compromised in those cases.

In two cases, the factories received, inspected and took the stores on charge on the same day (31 March) even before physical receipt of the stores as brought out below:

- Against an order of January 2009, M/s S.S. Enterprises, Kanpur supplied 76,400 metre polyester tape 25 mm (Challan No. 01 dated 8 April 2009)

to OPF, Kanpur. However, the factory received, inspected and brought the stores on charge on 31 March 2009; and

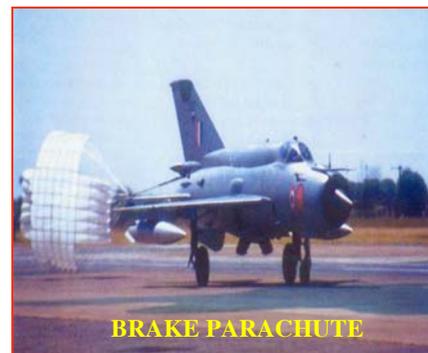
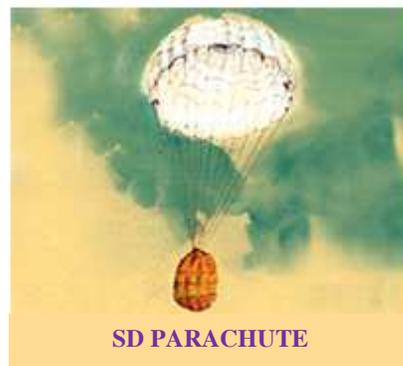
- M/s Sunil Industries, Mumbai despatched 27,828.60 metres Cloth Gabardin to OEF Hazratpur (Challan No. 883 dated 31 March 2011). However, the factory received, inspected and took on charge the consignment on 30 March 2011.

This indicates that the factories prepared advance receipt vouchers without physical receipt and inspection of the materials only to facilitate payment to the suppliers.

The Ministry justified the preparation of a few receipt vouchers on 31 March *i.e.* on the date of receipt on the grounds of exigency of commitments at the closure of the financial year. The justification given by the Ministry citing exigency goes against the general principles relating to expenditure and payment of money out of public fund. The Ministry needs to ensure that such irregularities are not resorted to.

7.3 Acceptance of materials with deviation

Paragraph 12.1 of SOP permits acceptance of materials with deviations from design or specification which is limited in its application to cover a definite quantity or period or a particular purchase order. Acceptance of materials with minor deviations is allowed only when it does not affect the serviceability, function, durability, interchangeability or safety.



We observed instances of acceptance of materials in deviation from the specifications in a routine manner by the QC sections of the factories which resulted in various defects in the manufacturing process and adversely affected the function and safety of the end products. Consequently, even the end products were also found rejected in inspection by the Quality Assurance

Establishment and returned for rectifications because of defective input materials. A few illustrative cases are given in Table-31.

Table-31: Acceptance of materials with deviations

Factory	Item Supplier Date of order	Audit observation	Ministry's reply	Audit comments
OCFA, OEFH	Fabric for <u>parachute</u> M/s Maharaja Shree Umaid <u>Mills Ltd.</u> May 2010	Contrary to the quality advisory note (November 2009) of DGQA organisation the factories accepted fabric (costing ₹2.78 crore) with weaving defects and used in production of parachutes.	The material was accepted as per supply order conditions without any compromise with the quality.	Contrary to the caution in the advisory note regarding possible failure of parachutes due to air permeability, defective fabrics were utilised in manufacturing parachutes. The cutting shop had also complained of the defects in 34,000 metres of fabrics. But replacement was not made. This indicates that the materials not meeting the specified parameters were used for manufacturing parachutes.
OCFS	Fabric for cap glacier and coat <u>ECC</u> M/s RADO Industries <u>Ltd.</u> October 2010	Despite deviations from the specified parameters of 'course and wales and mass of base/aluminized fabric', the item (costing ₹37.05 lakh) was accepted.	The factory had accepted the store considering aluminium coating and bursting strength of the fabric more than the specified.	Acceptance of material despite repeated deviations from the specified parameters and its issue to the shop was indicative of lack of quality control over issue of input materials. The cutting shop had also complained of the defects in the stores which indicates material did not meet the specified parameters.
OCFS	Fabric for <u>Coat ECC</u> M/s Shubh Swasan (I) <u>Pvt. Ltd.</u> October 2010	Though the store (costing ₹3.28 crore) could not achieve the specified value in parameters like threads/cm and mass/sqm in laboratory test, it was accepted under deviation.	The deviations would not affect the durability and serviceability of end products.	The acceptance and utilisation of material with deviation went against the specific instruction of SQA (GS) Shahjahanpur.
OEFH	Cloth Polyester and Cotton <u>Disruptive</u> M/s Nahar Industrial Enterprises <u>Ltd.</u> October 2009	The store (costing ₹3.35 crore) was accepted with deviation in colour fastness to rubbing (brown) and (black) with the value of $\frac{3}{4}$ instead of 4.	The acceptance of material with minor deviation was as per SOP for input material inspection and the deviation granted was as per norms.	The reply does not address the fact that acceptance of defective clothing fabric as minor deviations in a routine manner ultimately led to the major problems of fading of colour, mismatch of colour and texture of uniforms.

7.4 Repeated failure of items in quality assurance

Established items once passed in inspection by the Quality Control Section of the factories are not expected to be returned for rectification after proof inspection by the Senior Quality Assurance Establishment (SQAE), since quality control involves 100 *per cent* inspection and weeding out of all non-conformities.

However, at times when the product is put up for final acceptance in quality assurance, representative of SQAE may return the product, which fails to fulfil the criteria for the final acceptance. Such type of product is categorised as Returned for Rectification (RFR) and put up for fresh inspection after its rectification by the factory.

High incidences of RFR items are given in Table- 32. The factory-wise trend of RFR of 34 items out of 91 items produced in 2008-09 and 143 items out of 187 and 208 items produced in 2009-10 and 2010-11 and 60 items out of 77 items produced in 2011-12 was analysed.

Table-32: Factory-wise details of RFR cases

Factory	2008-09		2009-10		2010-11		2011-12	
	No. of items	Range of RFR percentage	No. of items	Range of RFR percentage	No. of items	Range of RFR percentage	No. of items	Range of RFR percentage
OPF	3	6.85 – 8.87	7	7.60 – 12.28	7	8.05 – 12.99	10	7.33 – 14.79
OCFS	15	21.41 – 66.39	12	21.53 – 55.87	12	15.23 – 73.21	16	10.93 – 48.87
OCFA	5	5.44 – 42.90	5	6.54 – 32.80	2	20.57 – 34.18	10	19 – 54.66
OEFG	3	3.49 – 10.04	4	3.12 – 100	3	8.89 – 33.97	6	9.52 – 50.06
OEFC	**	**	103	5.66 – 22.02	29	6.52 – 42.59	14	6.91–27.80

** Data not available in the required format as asked for by us

We observed that –

- Addl. DGOF of OEF HQ apprised (March 2008) the Sr. General Manager (GM) of OCFS of high RFR percentages in various garments arising from improper and ineffective pre-inspection performed by the Line Inspectors. He also instructed the Sr.GM to strengthen the pre-inspection mechanism for reduction of RFR percentages to bare minimum. However, no improvement had been noticed in RFR. Again in February 2012, SQAE (GS) intimated GM, OCFS of high incidence of RFR citing the ineffective/improper pre-inspection of finished products as well as casual stamping of quality clearance on the products by the designated staff.
- Significant quantum of RFR beyond 20 *per cent* and up to 100 *per cent* in 72 out of 266 instances was recorded in respect of 31 items during 2008-12.

This clearly indicates inefficiency of the factories in the manufacture of items conforming to the specified quality and lack of proper quality control mechanism at the factory level. Such deficiencies tend to increase cost of production of these items due to further rectifications at the factories followed by reproof carried out by the Quality Assurance Agencies, which also adversely impacted the supply chain from the factories to the indentors.

OFB stated (April 2012) that:

- The reason for RFR projected by the resident SQAE(GS) was mostly based on subjective grounds, which was not easy to be challenged by the factory in absence of any objective evaluation criteria;
- Most of the defects occurring in bulk production of clothing items were rectifiable/subjective in nature and only a small percentage of it was non-rectifiable for which there is a provision of UAR percentage; and
- Stores (finished products declared as RFR) were rectified/ repaired by reprocessing without any extra payment to the worker.

The recurrence of RFR cases in respect of low technology/established products indicates lack of proper quality control in factories which ultimately resulted in slippages in delivery of the products to the consignees. CQA (T&C) Kanpur also admitted in July 2012 that RFR occurs when realistic quality checks are not carried out by the ordnance factories. Further, the claim that no extra payment was made for rectification of defects is not correct as time taken and wages paid for the rectification were not accounted for under Direct Material and Direct Labour cost in the factory's accounts. Instead, the same were booked incorrectly under Overhead.

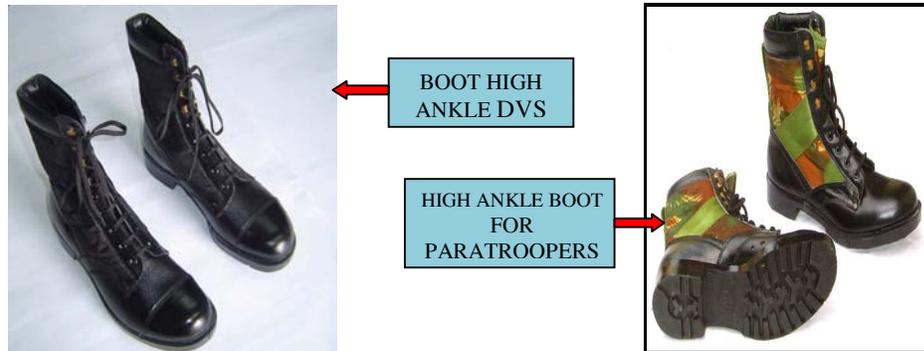
In the Exit Conference, Member (OEEG and Finance) also emphasised the need to book labour hour and labour cost for RFR cases.

7.5 Final rejection during quality assurance checks

Finished products cleared in quality control inspection by the factories are subjected to further quality assurance inspection by the SQAE before issue to the Services. At the quality assurance stage, items which are not rectifiable are declared as finally rejected. As factory's quality control involves 100 *per cent* inspection, there should not be any rejection at the quality assurance stage. We, however, observed certain instances of final rejection which are discussed below:

7.5.1 Final rejection at OEFC

OEFC manufactured sole for boot high ankle DVS from rubber compound purchased from trade sources. Responsibility of inspection of rubber item rests with the factory. SQAE (GS) Kanpur, the inspection authority of final acceptance, rejected 53,190 pairs Boot High Ankle valuing ₹10.17 crore during 2009-10 due to less hardness and less percentage of polymer content in sole. OEFC could also not meet the target of Army during the year 2009-10.



Despite rejection of the boots by SQAE(GS) Kanpur, the same were issued by OEFC to Central Reserve Police Force (CRPF) at a total price of ₹8.66 crore¹⁶. Since the boots, being common items for Army and MHA, are subjected to DGQA's inspection, the issue of rejected boots to CRPF was irregular.

On receipt of the boots, field units of CRPF made several complaints like heavy weight, hardness of sole and leather, poor pasting/stitching, heating of sole after walking short distance, *etc.* to Director General, CRPF. Accordingly, DG requested (July 2010) OEFC to replace the defective boots. However, no such replacement was effected so far (July 2012).

7.5.2 Final rejection at OCFS

We observed that 40,000 blankets worth ₹2.35 crore were rejected due to overweight/underweight during 2004-05 to 2008-09. Those blankets were still lying at the factory for disposal. However, the factory did not take corrective actions to improve the manufacturing process as well as quality control mechanism. We also observed rejections of four items (Net mosquito, Blanket, Jersey and Trouser) worth ₹1.49 crore during 2009-10 and 2010-11 at quality

¹⁶ Price of ₹1628 per boot fixed by OFB for issue to MHA.

assurance inspection by SQAЕ (GS) Shahjahanpur due to poor workmanship and finish, shade variation, incorrect dimension, loose texture, weight variation and damaged fabric, *etc.*

Factory Management stated in June 2011 that most of the defects occurring in bulk production of clothing items were rectifiable, and only a small percentage of it was non-rectifiable for which there was a provision of unavoidable rejection (UAR) in the estimate of end product.

The reply is not factually correct because (i) the UAR percentage provided in the estimate is applicable up to the production stage which has no relation with final rejection of end product at the quality assurance stage; and (ii) final rejection of the end products occurred as the defects were not rectifiable.

7.6 Rejections at the consignee end

If the quality control of factories and quality assurance mechanism by DGQA are efficient and effective, there should not be any consignee end rejection of items once they are passed in quality assurance inspection.

We observed instances of rejection of end products at the users' end. A few of the important cases of consignee end rejections of items costing ₹10.42 crore are given in **Annexure-IV**. Additionally, an instance of 1.70 lakh Coat ICK (costing ₹22.48 crore) received by the Army till March 2007 from OPF, OCFS and OEFH lying in rejected state as of July 2012, due to non-detection of defects during quality assurance inspection is also shown in **Annexure-IV**.

7.7 Customers' complaints

We observed that factories received number of complaints from the indentors on various defects and poor quality of the items supplied to them. Even rejections of same items due to same reasons were recurring and the factories were replacing the defective items in a routine manner. This arose from ineffective quality control by the factories' QC section and deficient quality assurance by the SQAЕ concerned as well as despatch of defective items by the COD Kanpur to the field units despite being declared unacceptable by the CQA(T&C) as discussed in the Paragraphs 7.4 to 7.6 *supra*. Factory-wise details of complaints¹⁷ are illustrated in **Annexure-V**.

¹⁷ Value of major complained items for which quantity was mentioned in the customer complaint register worked out to ₹5.95 crore

We further observed that OEFC had once re-issued (October 2009) the earlier rejected lot of Bag Universal as fresh issue to the Air Force. Even, Secretary (Defence Production) expressed (June 2010) serious concern and displeasure over the poor quality and delayed replacement of the defective Bag Kit Universal for Air Force. The above situation points to the need for strengthening quality awareness for customer's satisfaction. Response of the Ministry and our remarks are given in Table-33.

Table-33: Ministry's response and Audit remarks

Ministry's response	Audit remarks
OEFC : Rejected stores were either rectified or replaced by sending fresh stores without incurring any additional expenditure on labour and material.	Ministry's reply did not explain the reasons for customers' complaints leading to replacement of rejected items in almost of all cases involving additional expenditure despite availability of quality control mechanism in the factories as well as in the SQAEs.
OCFS : Only blanket blue was replaced by the factory. No replacement was made for other items which were found acceptable by CQA(T&C) Kanpur in their closure report.	
OCFA : Replacement cost of damaged stores was recovered from the transporters. For Trouser and Jacket, discrepancy reporting protocol was not followed by COD Kanpur/ Army units. Shortage would have taken place in transit between COD Kanpur and OD Shakurbasti. Matter was taken up with OEF HQ for settlement.	
OEFH : Failure was part of production process. Customers' complaints were either settled or design was under review.	

7.8 Audit conclusion

Ineffective quality checks by the OEFG led to recurring cases of acceptance of poor quality materials, significant quantum of RFR cases and final rejections of finished products at quality assurance stage. Persistent consignee end rejections and customers' complaints at the user end indicate failure to manufacture quality products by the factories and failure of QA agencies under DGQA to ensure quality checks at the assurance level. These shortcomings in the system were not effectively addressed at the highest level to ensure user satisfaction and comfort of troops.

Recommendation 14

OFB must ensure that the factories diligently follow the prescribed norms for inspection of input materials.

Recommendation 15

OFB may ensure that factories adhere to 100 per cent pre-inspection as required, by independent Quality Control staff of the factories.