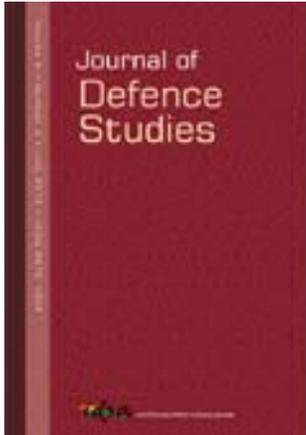


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# Efficiency of Quality Assurance in Army Procurements

*Mahendra Prasad\**

*This article gives an overview of the evolution of Quality Assurance (QA) in army procurements as also various shortcomings in the contemporary principles and practices that cause delays in procurements and their possible solutions. The list of shortcomings is not exhaustive; however, due care has been taken to bring out the most important ones which need immediate attention. The causal factors of these shortcomings have been analysed and recommendations to overcome them have also been listed to make the QA practice more efficient and minimize delays due to QA.*

Few people have the wisdom to prefer the criticism that would do them good, to the praise that deceives them.

—Francois VI, Duc de La Rochefoucauld

## INTRODUCTION

Modernizing the Indian Army and consistently keeping it equipped with the equipment of the latest technology is an inevitable requirement to ensure that its capabilities remain a step ahead of the envisaged security threats. In order to ensure that quality equipment is procured and to maintain transparency in procurements a number of agencies, namely, user/procurement directorates at Integrated Headquarters of Ministry of

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Defence (Army), maintaining agency (Directorate General of Electronics and Mechanical Engineering [DGEME]), Weapons and Equipment [WE] Directorate, Directorate General (Perspective Planning) (DGPP), Directorate General Acquisition, Directorate General of Ordnance Services (DGOS), Directorate General of Quality Assurance (DGQA), Defence Research and Development Organisation (DRDO), Ministry of Defence (Finance), Army Centre for Electromagnetics, etc., are involved. Each agency has a specific role at various stages of the procurement process. Defence Procurement Procedure (DPP) and Defence Procurement Manual (DPM) exist for Capital and Revenue Procurements, respectively, and are periodically reviewed.

Defence hardware is procured under 'Capital' and 'Revenue' heads. Two different agencies, namely, the Directorate General Acquisition and DGOS are responsible for Capital and Revenue procurements, respectively. Based on the value of the hardware, a number of Competent Financial Authorities (CFAs) up the hierarchy are empowered to grant the financial sanction for the procurements.

Capital acquisitions<sup>1</sup> are further categorized as 'Buy', 'Buy and Make', and 'Make' cases. 'Buy' cases can be 'Buy Indian' and 'Buy Global'. Additionally, the equipment required urgently can be procured through a 'Fast Track Procedure'. The procurement plan of hardware from Capital head is covered under three heads:

- Fifteen years Long Term Integrated Perspective Plan (LTIPP).
- Five years Services Capital Acquisition Plan (SCAP).
- Annual Acquisition Plan (AAP), which is a subset of SCAP and is a two-year roll on plan.

Revenue procurement<sup>2</sup> implies procurement of items and equipment, including replacement equipment (functionally similar) assemblies/sub-assemblies and components, to maintain and operate already sanctioned assets in the Services. The procedure for revenue procurements is enumerated in the DPM.

Whatever may be the procurement channel, the DGQA carries out the QA checks of all the hardware.

### **EVOLUTION OF DGQA<sup>3</sup>**

Since the days of East India Company till the end of World War I, the requirements of the Army for general stores, clothing, and armaments

were met mostly by import from United Kingdom. Some production facilities were, however, set up in India during this period to supplement the imports from the United Kingdom. A need was felt to superimpose inspection units over these indigenous defence supplies manufacturing establishments to ensure that only best quality products came out of them. The following inspection establishments were, therefore, set up progressively:

- Inspectorate of the Ammunition Factory, Kirkee, 1869.
- Chief Chemical Inspectorate, Nainital, 1908 and Inspectorate of Explosives and Chemicals, Kirkee, 1920.
- Inspectorate of Guns & Rifles, Jabalpur 1911.
- Inspectorate of Gun Carriages, Jabalpur 1911.
- Inspectorate of General Stores, Kanpur 1912.
- Inspectorate of Ammunition, Kirkee 1921.
- Inspectorate of Small Arms, Ichapur 1921.
- Inspectorate of Guns and Shells, Cossipore 1929.
- Chief Inspectorate of Mechanical Transport, Chakala 1929.
- Inspectorate of Scientific Stores, Rawalpindi 1939.
- Inspectorate of Metal & Steel, Ichapur 1940.

During World War II, the production rate of defence hardware was considerably enhanced. This necessitated augmentation of inspection facilities too. The following directorates of inspection were thus created under the Master General of Ordnance (MGO):

- Directorate of Armaments, MGO's Branch.
- Directorate of Mechanisation, MGO's Branch.
- Controllerate General of Inspection, Directorate General of Supplies and Disposal (DGS&D), Ministry of Industry and Supplies.

They were given the overall responsibility of ensuring the quality of stores manufactured by the Ordnance Factories/trade and supplied to the troops.

In 1946 these organizations were grouped to form a composite inspection, research and development organization called the Directorate of Technical Development (DTD) under the MGO's Branch. It was the first time that the full control of all functions relating to inspection, testing, and research and development of armaments, instruments, electronic stores, vehicles and engineering stores, medical stores, petroleum products,

jute goods, etc., were vested in a single technical-cum-administrative authority. An Inter-Services Store Preservation Organization (ISSPO) was also subsequently created and placed under the MGO.

In 1947, the MGO's post in the Army HQ was abolished and the DTD was placed under the General Staff Branch. The MGO's Branch was re-established in April 1949 and DTD once again came under the MGO's control. In 1955, on the recommendation of Armed Forces re-organization Committee, DTD was transferred from Army Headquarters and placed under the direct control of MoD. It now directly reported to the newly created Controller General of Defence Production (CGDP).

In 1956, DTD was bifurcated into two separate directorates, i.e. Armaments and General. In 1958, a beginning was made to separate the Research and Development (R&D) and Inspection functions of these two directorates. The re-organized Directorate of R&D (Armaments) was transferred to the newly created R&D Organization while the Inspection Organization remained under the CGDP and was re-organized into:

- Directorate of Inspection Armaments.
- Directorate of Vehicles and Engineering.
- Directorate of R&D (General).
- Directorate of Production and Inspection, Electronics.
- Directorate of Stores Production (Navy).

In 1961, the Directorate of Vehicles and Engineering was further bifurcated into the Directorate of Inspection of Vehicles, which remained under CGDP while the Directorate of Engineering was transferred to the R&D Organization. In March 1963, CGDP was re-designated as the Controller General of Inspection and Planning (CGIP). In August 1963, the Planning Cell of the CGIP was placed directly under the Secretary (Defence Production) and CGIP was re-designated as the Director General of Inspection (DGI). In 1964, the Directorate of Stores Production (Navy) was re-designated as the Directorate of Development and Inspection (Marine Stores). A new Directorate, namely, the Directorate of Warship Project was created in 1968 to assist the Leander Class Frigate Project. In 1968, the Directorate of R&D (General) was bifurcated into Directorate of Inspection (General Stores) and Directorate of R&D (General Stores).

Due to changing needs, in 1976 these agencies were re-engineered into the following three independent organizations:

- Defence Research and Development Organization.

- Directorate General of Inspection.
- Directorate of Technical Development and Production (Air).

The Directorate General of Inspection was re-designated as Directorate General of Quality Assurance (DGQA) on 4 July 1987. The DGQA Organization, at present, is under the overall control of Department of Defence Production and Supplies in the Ministry of Defence (MoD).

#### **PRESENT ORGANIZATION OF DGQA<sup>4</sup>**

DGQA, with its headquarters at South Block, transacts its business through four levels of establishments. These are spread all over the country where mainly the Ordnance Factories (OFs), Defence Public Sector Undertakings (DPSUs), and industrial bases exist. The lowest establishments amongst these are the *Senior Quality Assurance Establishments* (SQAEs), which are headed by an officer of the rank of Colonel or equivalent officer from the Navy, or equivalent civilian officer of Defence Quality Assurance Service (DQAS) cadre. Some SQAEs have established wings in the campuses of OFs and DPSUs for hastening up the process of inspection of defence hardware. These wings are headed by officers of the rank of Lieutenant Colonels/Principal Scientific officers of DQAS cadre. SQAEs are under the technical control of *Controllerates of Quality Assurance* (CQAs), which are headed by an officer of the rank of Brigadier/equivalent officer from Navy or Air Force/equivalent civilian officer of DQAS cadre. The CQAs, in turn, are under the direct administrative and technical control of 10 technical directorates. Each technical directorate is responsible for a group of technologically distinct equipment and is headed by an officer of the rank of Major General/equivalent officer from Navy or Air Force/equivalent civilian officer of DQAS cadre. Two out of these 10 directorates are exclusively for Navy: Directorate of Quality Assurance (Navy) and (Warship Projects).

Two additional directorates oversee the administrative work and policy, planning and training. All these 12 directorates report to DGQA through Special DGQA and all but those for Radar and Systems, Combat Vehicles, and Metals and Explosives are located at Delhi. As a matter of policy, the appointment of DGQA is always filled by a service officer of the rank of Lieutenant General while the senior most officer of DQAS cadre holds the appointment of Special DGQA. Appendix 1 features a chart showing the organization of DGQA down to directorate level.

#### FUNCTIONS OF DGQA<sup>5</sup>

DGQA provides QA cover for the entire range of Arms, Ammunitions, Equipment and Stores supplied to Armed Forces. In other words, the Directorate is responsible to ensure that only the right quality product reaches the users.

Apart from QA activities, the organization is responsible for import substitution and associates with the Defence Research and Development Organization (DRDO) in the development projects. It also ensures Documentation, Codification, and Standardization action for minimising the variety and range of components/equipment. The other services rendered are post-procurement services like warranty management and repairs, defect Investigations, assessment, and registration of suppliers in consonance with the Joint Services Guide (JSG) on the subject, and technical consultancy to the users, ministries, and the production agencies. Till 2008, indigenization of products and their parts was also being done by DGQA. This function has since been taken over by the Corps of Electronics and Mechanical Engineers (EME).

The DGQA is associated with the procurement process from the inception stage. Beginning with the vetting of response of vendors to Request for Information (RFI), formulation of General Staff Qualitative Requirements (GSQRs), preparation of Requests For Proposals (RFPs), providing inputs to procuring agency about prospective vendors in case of Limited Tender Enquiries (LTEs), pre-bid meetings with vendors, tender opening, vetting of technical bids, field, technical and environmental evaluation of equipment along with the users, cost negotiations, to vetting of contract document till the placement of supply order, the technical directorates assisted by CQAs and SQAEs play a crucial role. Invariably a member from DGQA is associated in all these activities as a statute. DGQA is also responsible for independent technical and environmental evaluation of the test sample provided by the vendors using Non-Destructive Testing (NDT) techniques at various laboratories. These laboratories are generally located at various CQAs and SQAEs; certain tests for which the facilities are not available with DGQA are to be arranged by vendors at certified/accredited laboratories at their own cost. A DGQA representative is also an associated member of Board of Officers (BOO) responsible for field trials<sup>6</sup> of the equipment.

**Procedure of Acceptance (Capital Procurements)<sup>7</sup>**

The major role of DGQA, however, comes to the fore after placement of the supply order. An Acceptance Test Procedure (ATP) incorporating all the tests and certification for acceptance of the product ordered is prepared. A sampling plan is formulated to work out a significant sample size based on the lot size of the product offered by the vendor, total quantity ordered, and the scientific principles of statistical quality control. Based on the delivery schedule mentioned in the supply order/contract document, the vendor offers the lots of product, which are inspected by a team of DGQA personnel from the nearest SQAE (known as the area SQAE). Sampling plans approved by the CQA, on which these SQAE are dependent for technical guidance, are strictly followed. The products, which clear all the inspection tests, are stamped by a unique inspection number and dispatched to the pre-designated Ordnance Depots (ODs) or Engineer Stores Depots (ESDs for Engineering Equipment) for issue to the user units.

An inspection note (I note) is prepared indicating the lot size of the product, number accepted, total number on order, and total number accepted till the date of initiation of the I note. This procedure is repetitively carried out till the supply order is completed. During inspection of the lot, all accepted items are marked as 'accepted' and those not accepted are marked as 'Rejected' and segregated in a manner to ensure that they are not mixed into the next lots. In case of imported products, every time the vendor offers a lot of products, a team of DGQA is dispatched to its manufacturing location to carry out a Pre-dispatch Inspection (PDI) before the product is shipped to India. The items are then packed and sealed in front of this team with a packing note duly signed by the inspecting team as well as the vendor's representative. On arrival of goods in India, a Joint Receipt Inspect (JRI) is carried out by a BOO in the presence of the representative of vendor to check for correctness of the goods and to ascertain any damage that might have occurred during transit.

Once an item is procured and it is felt by the user that its replacement would be required in future, the item is introduced into service and the CQA responsible for the equipment is asked to prepare the item's complete technical specifications, which include the drawings and blue prints. After approval of these technical specifications, they are sealed and retained by the CQAs and all future procurements of the same equipment is done

based on these specifications and *not* on GSQR of the equipment (repeat orders under option clause are, however, placed based on the GSQR). CQAs, for this reason, are also referred as Authority Holding Sealed Particulars (AHSP). However, the DGQA is not the AHSP for all the equipment of Army; ordnance factories under Director General Ordnance Factories (DGOF) are the AHSP for certain types of 'B' vehicles.<sup>8</sup>

#### **Acceptance Test Procedure (ATP)<sup>9</sup>**

Whenever a supply order is placed or a contract is concluded, the vendor forwards a standard test procedure, specific to the ordered product, which is generally followed by its quality department. This procedure incorporates various tests as well as the methodology of conducting them, which are carried out on the finished product after it leaves the assembly line. It also indicates various dimensional measurements and their upper and lower control limits. In addition, this document contains all the tests that are carried out on raw material prior to their acceptance. In case any major assemblies like engine of an automobile or generating set, starter motors, alternators, etc., are outsourced by the main vendor, either their certification from a national accredited laboratory or separate test procedures for them are forwarded to the CQA (called the mother AHSP) responsible for the complete equipment. Based on the adequacy of these tests and certifications, mother AHSP can accept them or modify those, incorporating additional tests and certifications.

In case of complex equipment like tanks and self-propelled guns, the mother AHSP takes assistance of other CQAs for testing of systems, assemblies, and sub-assemblies of their technological domain. For example, in case of a tank, the mother AHSP is CQA (combat vehicle) but the fire fighting equipment of the tank is tested by CQA (Fire Fighting Equipment), all the electronic equipment are tested by CQA ('A' vehicle electronics), all the Nuclear Biological and Chemical (NBC) protection equipment are tested by the NBC wing, all the air-conditioning equipment is tested by CQA (engineering equipment), etc. These CQAs are, therefore, responsible for scrutinizing the ATP portion pertaining to equipment of their responsibility. The coordinating agency, however, remains the mother AHSP.

After the ATP is finalized, a copy of the same is sent back to the vendor to enable him to make necessary inspection facilities available to the inspection team whenever the product is offered for acceptance.

### **Training for Equipment Specific Quality Assurance**

DGQA personnel are technically qualified and competent to undertake the general task of inspection. However, there is always a requirement to train them on any new equipment being procured, as the intricacies of quality testing vary with equipment. Specific quality tests applicable to specific equipment can be understood only after learning in detail their design, materials, and production processes. This training is imparted to the QA personnel by the same vendor to whom the supply order is placed.<sup>10</sup>

### **Pilot Sample**

While carrying out technical and environmental evaluation of equipment it may emerge that an excellent product may require certain modification or minor design change like changing the analog instruments with digital ones or re-aligning or re-locating a battery compartment/tool box or may be making a winch remote wireless. In order to ensure that a good product is not rejected for trivial issues, an undertaking is taken by vendor to carry out such modifications/design changes at the time of offering the bulk. The vendor does these modifications/design changes in the first equipment he offers for inspection and clearance. This first equipment is called the 'Pilot sample' and preserved till the last lot. The Pilot is included in the last lot. Requirement of Pilot sample is waived off in case no changes in the sample offered by the vendor for trials are considered necessary.

### **Quantum of Inspection and Sampling Plan<sup>11</sup>**

Quantum of inspection is categorized as *Qualitative* and *Quantitative*. While the qualitative category dictates the nature and depth (extent) of inspection, namely, lenient, normal, or stringent based on the number of verifiable parameters and attributes of a product to be checked, the quantitative category, better known as the scale of inspection, dictates the number of items to be inspected.

It may be little number of random samples or 100 per cent of the population. Quantum of inspection is laid down in the Quality Assurance Instructions (QAI) of the product by the AHSP, issued as a guideline to the SQA responsible for inspection. SQAEs prepare a Quality Assurance Plan (QAP) for the product based on these QAIs as also the following factors:

- Whether the production agency/ vendor has carried out 100 per cent inspection of the lot and removed defectives, before offering it for acceptance by DGQA.
- Level of confidence in the manufacturer/supplier. The higher the confidence level, lower will be the quantum of inspection. However, in case of any rejections at the acceptance inspection levels, the quantum of inspection may be increased qualitatively and/or quantitatively by the SQAE. Nonetheless, great care is taken if quantum of inspection is to be reduced for a reputed vendor as there are chances of litigation by the not-so reputed vendors.

The sampling plan is prepared based on the Indian standard on Sampling issued by the Bureau of Indian standards (BIS). However, in rare cases, with the approval of technical directorates, 100 per cent inspection may be carried out.

#### **Development Projects by DRDO**

DRDO is the AHSP for their development projects till the time equipment being developed by it goes into production. It is also responsible for the inspection of raw/input material, and systems/sub-systems of the equipment. It transfers the inspection and AHSP responsibilities to DGQA only after the Army places a production order. It has been observed (as in case of Unit Maintenance Vehicle [UMV] and Unit Repair Vehicle [URV]) that the AHSP transfer at a later stage suffers lot of road blocks as a number of queries raised by the QA agency taking over the AHSP responsibility go unanswered.

#### **Fast Track Procedure**

In case of new equipment being procured under this procedure, the 'Technical Evaluation' and 'On Site Evaluation by an Empowered Committee' are required to be carried out.<sup>12</sup> The time frame for both these activities has been clearly laid down and there is a requirement to adhere to the time lines due to the fact that this procedure is resorted to in the eventuality of urgent operational requirements foreseen as imminent, or for a situation in which a crisis emerges without prior warning.<sup>13</sup> In a recent case of procurement of boats for a Quick Reaction Team (QRT), there has been undue delay on part of QA of Engine. The new QRT boats were required to replace the obsolete ones at Pangong-Tso Lake at the Line of Actual Control (LAC).

### **QA of Items Manufactured by OFs and DPSUs**

These items are also Quality assured by DGQA. The interesting aspect is that all the three agencies, namely, OFs, DPSUs, and DGQA are under the control of Secretary, Defence Production (DP). The authority of inspection of raw material and other input materials like assemblies, sub-assemblies, and components have been delegated to the manufacturers of the final product.

### **Procedure of Acceptance (Revenue Procurements)**

In case of equipment procured out of revenue budget head, the procedure of QA is similar to that of equipment procured out of capital head with the following broad variations:

- AsHSP vet draft tender enquiry.
- Technical and environmental evaluation of equipment is not carried out. Instead, a tender sample from each vendor is sought along with techno-commercial bids and evaluated against the already sealed technical specifications.
- Prior to placement of supply order, registration status of the vendor (on whom the order is to be placed) is checked. In case the vendor is not registered with DGQA or any of the agencies/ departments of the MoD, its capacity verification/narrative assessment is carried out by AsHSP to assess whether the vendor has adequate manufacturing facilities, human resource, capital, and past credentials to successfully meet the order.

### **ANALYSIS**

The procedure of technical and environmental evaluation of new products and subsequent acceptance inspection has evolved over a long period of time. However, the conditions laid down for acceptance are extremely stringent and capital intensive for vendors participating in the bidding process. In addition to the cost of at least one sample (in many cases where the field trials have to be hastened, more than one sample is sought to carry out field, maintainability and technical evaluation concurrently) required for trials, the participating vendors have to incur expenditure on the following:

- Arranging test facilities, which are not available with DGQA.
- Transportation of equipment from one place to another for different tests.

- Movement of equipment to various terrains (desert, high altitude/ extreme cold) where the equipment is actually to be deployed.

The stakes are very high as finally only one vendor is likely to get the contract. Expenditure incurred by all other vendors not winning the bid, therefore, becomes wasteful expenditure and discourages them from fielding their equipment. It has been observed that many vendors withdraw at this stage. This procedure is in consonance with the DPP and DPM and though the expenses on account of technical and environmental evaluation, which is the responsibility of DGQA, range between 25 per cent to 33 per cent of the total expenditure incurred by the vendors<sup>14</sup> on trials, there is a scope of cost reduction by modifying the evaluation process.

In case of complex equipment where a number of AsHSP are involved, Coordination at mother directorate level is far from satisfactory and causes delay in response from the AsHSP that are not under their direct control. In order to cut time delays, user and WE Directorate in such cases, resort to direct interaction with all such directorates of QA and many a time with CQAs, that are responsible for various systems of the equipment. Unfortunately, the user directorates lack clarity on which QA directorate deals with which system/sub-system of the equipment and this results in a lot of in-fructuous correspondence thereby causing further delays. The possible reason for this may be the fact that procurement is one of the tasks of the user directorates and probably does not rank very high in their priorities.

Lack of poly-valent/multi-skilled engineering staff with DGQA is invariably evident from the fact that the number of DGQA staff attending a meeting (especially pre-bid meetings with vendors and technical evaluation committee meetings) exceeds those from other departments/branches/directorates. At times, one could find one representative each from DGQA for electronics section, fire fighting section, NBC section, air-conditioning section, armament section, stores section, vehicle section, etc., for complex equipment.<sup>15</sup> This, at times, calls for avoidable movement of a number of officers from AsHSP located across the country.

The draft ATP is prepared by the vendor on whom the supply order is placed. Since vendor has a vested interest it may not mention some very important tests for which he does not have the facility, and/or certifications which he might not have obtained for his product. Though DGQA is empowered to completely change the ATP, yet it needs to be seen as to how many have undergone a complete change from that submitted by

the supplier, especially in case of those equipment where reports have been raised regarding lot of defects revealing equipment flaws related to material, process, design, and military ruggedization, after reaching the hands of users. There is a need to prepare a well-researched ATP for ensuring better quality. In addition, the technical and environmental evaluation of the equipment provides relevant inputs for ATP and thus the time spent on these evaluations should not be considered wasted. If meticulously carried out, these tests assuage the problems faced during Trade Inspections.

Training of QA personnel by the same vendor, who supplies the equipment that these QA personnel inspect for clearance at a later date, seems rather odd. There is a possibility that a vendor, who wishes that certain parameters of his product should not be verified, will deliberately exclude those aspects from training curriculum.

Not involving DGQA in their equipment development projects since their inception by DRDO is a sore point with DGQA, as the design and development stage of any equipment allows one to learn better about the equipment than any equipment orientation training at a later stage after its prototype is fully developed. Unfortunately, this happens despite the fact that both the agencies—DRDO and DGQA—are under the control of a single department, namely, the Department of Defence Production (DDP).

So far as FTP is concerned, from the case of QRT boats, it emerges that no QA strategy presently exists for such procurements. The case in point has brought out very important lessons and these should not be forgotten in order to obviate such hindrances in future.

Normally, it is the prerogative of buyer to satisfy himself regarding the quality of the product he pays for. Therefore, depending upon the specialty required to inspect the item he intends to procure, he nominates one of his agencies or an independent agency for QA. Under no circumstances can a seller be delegated the authority to validate the quality of the products being supplied.<sup>16</sup> In case of QA of items manufactured by OFs and DPSUs, this fundamental principle is evidently violated and the user, that is, the Army is forced to accept whatever is supplied to them.

Last, but not the least, the quality of human resource undertaking the QA job has a lot of room for improvement. The DQAS cadre is selected based on only an interview while the officers seconded from services, Permanently Seconded Service Officers (PSSO) cadre comprises a majority of those Army officers who have been overlooked for promotion

in the regular Army. Surprisingly, a number of officers not possessing a technical degree are placed to supervise the highly technical nature of the QA job. At times, officers with basic degree of civil engineering or electronics are deputed abroad to carry out the PDI of equipment, which is mechanical in nature. This mismanagement amongst the officer cadre has led to overdependence on the subordinate staff comprising of Group-B and Non-Gazetted Officers (NGOs).<sup>17</sup> Innovative adoption of QA procedures and decision-making, therefore, are the worst casualties. Nonetheless, there are a few brilliant officers and these few good people are the ones who are the saving grace.

#### RECOMMENDATIONS

In order to cut costs and time required for technical and environmental evaluation, it is recommended that only those tests should be undertaken by DGQA which are not possible to be carried out elsewhere at various laboratories accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) in the country. Vendors can be intimated about all the tests at the RFP stage and told to get their products tested before offering them for trials and produce requisite certification from NABL-accredited laboratories. Though presently DGQA is accepting these certifications, all vendors do not produce them and a considerable amount of time is thus used for testing of equipment samples offered by such vendors. They may also be apprised of the specific tests that will be carried out by DGQA in its laboratories for which facilities do not exist anywhere else in the country. Also, provisions to compensate the vendors who offer their products for trial should be made in the DPP. This will encourage vendors to offer their product for trial.

Reputed vendors may be permitted self-certification on a case-to-case basis taking into account their past performance. In case of foreign vendors, certification from their respective government's regulatory authorities may be permitted on a case-to-case basis.

To address the interaction problems of user and WE directorate with DGQA, it is felt that a single window system for interaction with DGQA will go a long way to obviate this long-standing sore point. For this, the present single window of DGQA, that is, directorate of PP and T needs to be augmented with staff pooled in from all the technical directorates. Alternately, the proposed Directorate of Customer Services under their cadre review proposal needs to be sanctioned by MoD and established on

priority to enable single window interaction with services. At a later stage once the staff involved in the procurement process starts getting trained at the Defence Acquisition Institute (whenever it is set up) as proposed by Mrinal Suman<sup>18</sup>, this requirement may automatically fade away.

For creation of a pool of staff possessing multiple skills, bifurcation of staff into broad streams such as mechanical, electronics and computer science may help. Skill development may be carried out by inter-directorate postings and augmentation of training facilities at Defence Institute of Quality assurance (DIQA), Bangalore. Adequate exploitation of vacancies for equipment-oriented training at Category 'A' establishments of Army also needs to be carried out as was done earlier.

Regarding ATP, it is felt that a well-researched and stringent ATP can minimize occurrence of a number of defects due to material and manufacturing inadequacies, after the equipment is put into service. It is, therefore, recommended that although the draft ATP is welcome from the supplier, it should be compared with what other vendors manufacturing similar equipment are doing in order to ensure quality. International best practices should be researched and incorporated in the ATPs. For this an ATP cell (a virtual one to begin with) may be required at the AsHSP. A standard exhaustive ATP format needs to be prepared after deliberate research and uploaded on the website of DGQA for reference by the vendors.

QA personnel who have to finally carry out the inspection of bulk of the ordered equipment should not only be trained by the vendor on whom the supply order is placed but also by other vendor or any other agency dealing with identical equipment, even at the cost of repetition. Alternately, a few could be trained by different agencies/vendors and can exchange notes to ensure that all the aspects of QA of the equipment have been covered. This will also assist in preparation of a comprehensive and effective ATP.

For better synergy between the DRDO and DGQA it is mandatory to involve the QA agency that is going to take over the AHSP responsibility with DRDO developmental projects from their inception. This would not only ensure a smooth AHSP transfer at production stage but also assist in development of a better quality product due to concurrent quality suggestions that the AsHSP are competent to make. Additionally, this would allow for a simultaneous development of a QA plan for the equipment. The DDP needs to coordinate this aspect more efficiently and forcefully.

In case of fast track procurements of new equipment, wherein Technical Evaluation and On-Site Inspection by an Empowered Committee are mandatory requirements, a viable, efficient and effective QA procedure needs to be evolved in the form a Standard Operating Procedure (SOP). This SOP can be suitably customized to fit the type of equipment being procured beforehand in order to ensure that the procurement does not get delayed due to the QA, and that the vendor does not offload its junk to us due to paucity of time.

The Army has to seriously take up the matter of bringing the DGQA under its control to ensure that the QA of items being procured from OFs and DPSUs is carried out without any bias and with complete objectivity. In case this is not forthcoming, a cell under Director General of Electronics and Mechanical Engineers (DGEME) may be created for QA for all equipment being procured repetitively from OFs and DPSUs.

The selection process of the officer cadre needs a complete revamp as well. While the DQAS cadre needs to come out of Indian Engineering Services (IES), the PSSOs need to be inducted early, perhaps between 8-12 years service through a written test in engineering and aptitude for QA job. To eliminate subjectivity in selection process for deputation abroad for PDI, it needs to be ensured that the process is not merely based on recommendation up the chain of command but also on the skill and knowledge about the equipment to be inspected.

#### CONCLUSION

For the success of any military mission, the right equipment at the right time in the hands of soldiers is as important a factor as the training and physical fitness of the soldier himself. Thus factors causing delay in procurement of Army hardware need to be identified, analysed and eliminated. Though mostly inadvertent, these delays can occur at various stages of procurement of equipment and none of the agencies involved in procurement can be absolved of the responsibility of causing them. This article identifies the causes of such delays due to QA procedures and recommends certain practical solutions to overcome existing shortcomings.

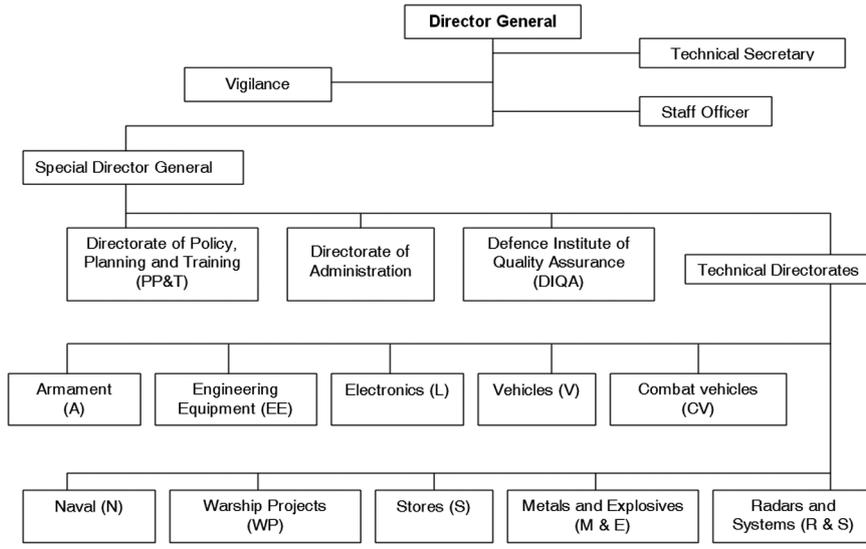
The two most important features that equipment in the hands of soldiers must possess are high reliability and military ruggedization. Military equipment are required to be operated in war/warlike situations and must not fail during missions. It is for these reasons that the importance

of quality assurance at the time of their induction in service assumes a critical role. An attempt has also been made to identify and address a few hindrance-causing factors in the QA modalities in procurement of hardware for Army so as to draw attention to this important factor.

#### NOTES

1. Defence Procurement Procedure (DPP), 2011, pp. 2–3.
2. Defence Procurement Manual (DPM), 2009, p. 11.
3. See <http://www.dgqadefence.gov.in/toplink.php?id=15&pid=23>, last accessed on 30 March 2012.
4. <http://www.dgqadefence.gov.in/toplink.php?id=15&pid=23>, last accessed on 30 March 2012.
5. Author's interview with a senior serving officer of DGQA, New Delhi, May 2012.
6. Defence Procurement Procedure, n. 1, p. 13.
7. Author's interview with a senior serving officer of DGQA, New Delhi, May 2012.
8. *Principles and General Instructions for QA, DGQA Standing Orders (Technical)*, Vol II, Chapter V, Section I, 2010, p. 3.
9. Author's interview with a senior retired officer of DGQA, New Delhi, May 2012.
10. This requirement is always mentioned in the RFP as well as SO/contract document.
11. *Principles and General Instructions for QA, DGQA standing Orders (Technical)*, n. 8, pp. 16–17.
12. Defence Procurement Procedure, n. 1, p. 213.
13. *Ibid.*, p. 203.
14. This emerged during informal discussions with representatives of a number of vendors.
15. Author's personal experience while serving with DGQA.
16. Suman, Mrinal, 'Desperate Measures: Department of Defence Production and Conflict of Interest', *Force*, Vol. 9, No. 8, April 2012, p. 31.
17. Author's personal experience while serving with DGQA.
18. Suman, Mrinal, , 'Defence Acquisition Institute: A Viewpoint', *Journal of Defence Studies*, Vol. 6, No. 2, April 2012, pp. 1–11.

**APPENDIX 1**



Organisation of DGQA