Seminar Report

REVOLUTION IN MILITARY LOGISTICS: LEAN, SUSTAINABLE, RELIABLE SUPPLY AND MAINTENANCE CHAIN (S&MC)

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EXECUTIVE SUMMARY

The battlefield has become complex, multi-dimensional, non-linear, compressed time-space, a high tempo of operations, increased lethality, nuclear ambiguity and high degree of transparency with the advancement in technology, including information technology. The requirement is of highly effective logistical capabilities, integrated employment of resources, integration at the National and Armed Forces level and integrated approach to execute logistics. To rise up to the challenge, we must factor in all contingencies, incorporate all resources across the spectrum and consider all available logistics infrastructure in the theatres.

For enhanced flexibility of plans as well as have the capability to shift and redeploy logistics resources inter and intra-theatre, we must adopt a logistics model that factors in range and depth of inventory, streamlines procurement and delivery procedures, our core capabilities and the peculiarities of terrain.

The need to modify the structure and bring them in sync with tri-service operational philosophy, incorporating best practices and exploiting information technology exists. We should incorporate centralised direction, coordination and control within the three wings of the Armed Forces with a single accountable logistics head.

Application of Modern Technology

Advanced countries such as the United States and United Kingdom have transformed their logistics support system by infusion of modern technology. The Private Industry has brought about a Revolution in the Supply and Maintenance Chain by adopting modern concepts like anticipatory logistics, just-in-time (JIT) and third-party logistics. In our case, the changes made were 'incremental' in nature and have not given desired results. The infusion of modern technology can be focused on the following:

- Inventory tracking.
- Enterprise Resource Management in Inventory Management.
- Energising procurement.

Stand-alone packages implemented by Army, Navy and AF need to be integrated into a single system, which would, in turn, ensure seamless integration across and between processes.

Outsourcing

The Armed Forces should use the capabilities of the Private Sector for running activities performed solely by personnel of the Armed Forces/defence civilians. Outsourcing is a powerful tool to launch the reform of the Armed Forces and raise the effectiveness of the Defence Sector. The non-core activities of the Army which include repair/maintenance of vehicles/equipment, construction/maintenance of buildings and roads in cantonment areas, transportation of rations and stores to base areas, guarding military installations and supply convoys, provision of interrogators, transitory and transcribers, providing warehousing and storage facility, cleaning military facilities and so forth, are some of the activities that can be considered for outsourcing. Contract management and oversight by skilled personnel are critical to ensure that outsourcing is indeed beneficial. Medical services in peace areas and operation of training and simulation centres are other areas where outsourcing may be carried out.

Transformation in Supply Chain and Inventory Management in the Army

In the past seven decades, vast improvement in surface communication has taken place and the industrial base has grown exponentially. There is a need to review the system to bring efficiency without compromising assurance level. The British Armed Forces have adapted their Logistics Support System in-tune with advancement in technology and strategic analysis to meet the changing requirements. However, the Indian Army (IA) has relied more on cosmetic rather than structural changes. There has been a nominal reduction in the intermediary links in the Supply Chain and limited financial powers delegated. The existent structure and system of functioning in the Ministry of Defence (MoD) are deep-rooted, inefficient and slow to respond. However, any significant structural change, though desirable and much needed, is very unlikely in the foreseeable future.

The IA has an inventory range of more than 5 lakh items with very restricted visibility of stock levels. Automation of supply chain and inventory management functions in the last 20 years has not yielded desired results. There is, thus, an immediate need to absorb enabling technology with adequate focus on Human Resource Management.

Limited vendor base is another issue that needs to be tackled urgently. Private Sector participation in design, development and manufacturing is required to be encouraged. In this regard 'Make-in-India in Defence Sector' is a positive initiative and is likely to bring significant dividends in the next two decades. However, we need stable policies to encourage Private Industry to invest more in the Defence Sector. Indigenous equipment induction will ultimately have significant impact in ensuring better logistics support and will help in reducing stock levels as the assurance levels are likely to improve.

The acquisition lead time, in practice, is much more than the time stipulated as per the Defence Procurement Procedure. There is, thus, a requirement to review the acquisition procedure and processes, with the aim to shorten the acquisition lead time for procurement under both Capital and Revenue Heads. Committees formed for the same should have adequate representation from the Armed Forces.

The current system of compartmentalised procurement, repair and maintenance needs to be replaced with integrated S&MC solution based on Life Cycle Concept. Automation integration needs to be focused on, for achieving higher efficiency, transparency, visibility and better quality of logistics and maintenance support to the Field Army.

Adoption of Integrated Logistics

We need to fast-track our efforts to revolutionise the S&MC and gradually move to integrated single point logistics based on global practices and operational logistics (OL).

Indian Armed Forces should move to one logistical vertical under an empowered, single point control at Chief of Defence Staff (CDS)/ Chiefs of Staff Committee (COSC) level (as is the case in developed nations) with suitable adaptation based on local requirements. A pre-requisite for the same is to resolve service-specific sensitivities.

Integrated Material Management On-Line System (IMMOLS) in Indian Air Force (IAF) and Integrated Logistics Management System (ILMS)in Indian Navy have been in use for quite some time. Integrating these with Computerized Inventory Control Project (CICP) would be a challenge and we need to work it out.

Reorienting the Higher Echelons of Supply Chain Management

Major decisions in the IA are taken at the apex level, as the functioning of IA is highly centralised. Reorientation (understanding the essentials of logistics and maintenance functions) of the officers at the senior level is, therefore, necessary to maximise logistics support at the Field Army level.

Senior officers, especially those serving at Master General of the Ordnance (MGO), Quarter Master General (QMG) Branches, Operational Logistics (OL) and Weapons & Equipment (WE) Directorates, must have adequate experience at various levels in the field formations and Integrated Headquarters (IHQ) of MoD (Army).

Formulation of a Logistics Staff Stream consisting of all arms and services is recommended. Officers should be given an option to choose 'Logistics Staff Stream' from Colonel onwards and these officers may serve in MGO, QMG Branches and WE, OL Directorates.

Emphasis must be laid to ensure that the entire process of equipment procurement from 'Concept to Completion' should be expedited vigorously and should take lesser time.

We need to consider the aspect of 'Tail within the Teeth'. The hierarchy in the Armed Forces in general and IA, in particular, should make a sincere endeavour to optimise manpower by minimising the existing tail within the teeth.

DETAILED REPORT

"My logisticians are a humorless lot... they know if my campaign fails, they are the first ones I will slay".

— Alexander

"The essence of flexibility is in the mind of the commander; the substance of flexibility is in logistics".

— RADM Henry Eccles, U.S. Navy

General

Successful conduct of war is the art of the logistically feasible. While Revolution in Military Affairs has been discussed extensively, Revolution in Military Logistics has not yet received the desired attention. An effective military S&MC aims to provide the requisite item and service at the right place, right time, right quantity and in right condition.

Rapid advancement in technology in general and information technology in particular, have transformed the battlefield, making it multi-dimensional. The future wars will, therefore, require new logistical capabilities to sustain campaigns of highly integrated land, air, naval, space, special operation forces and information operations. The future wars, characterised by non-linearity, extended depth, high intensity, fierce tempo and spectacular battlefield transparency will require a quantum leap in strategic flexibility and responsiveness.

Advanced countries such as the United States and United Kingdom have transformed procurement procedures by infusion of technology. The industry brought about a revolution in the S&MC by adopting various modern concepts like anticipatory logistics, JIT and third-party logistics, while the Armed Forces still remain stuck in an age-old archaic system. The insignificant and incremental

changes, over the years by individual services have not given the desired results.

Transformation in Military S&MC is long overdue. While the aspects of security, reliability and response continue to be important factors in considering the quantum of changes and methodology, these factors must not hold us back from adopting an integrated, flexible, responsive, efficient and effective S&MC working on the principle of sense and respond. Blind adoption of logistics concepts of the industry may not meet the requirement of the Armed Forces. JIT does not work during continuous offensive operations. Hence, the Services need tailor-made logistics system based on best practices of the industry and those inherited by us.

To gain a holistic perspective on the subject, a seminar on 'Revolution in Military Logistics: Lean, Sustainable, Reliable Supply and Maintenance Chain (S&MC)' was organised on March 17, 2018 at CLAWS. The undermentioned issues were discussed.

Supply Chain Strategy

For enhanced flexibility of plans, have the capability to shift and redeploy logistics resources inter and intra-theatre, we must adopt a logistics model that factors in range and depth of inventory, streamlines procurement and delivery procedures, our core capabilities and peculiarities of terrain. The model should cater to the following:

- Responsive to unpredictable demands with minimum risk of disruption.
- Achieve sustenance for multiple theatres.
- Economy through adoption of systems approach to effect reduction in maintenance costs.
- Strengthen and empower repair echelons for in-situ repairs.

Procedures

The logistics procedures need an immediate review:

- Speedy and transparent procurement with minimum steps.
- Theatrewise procurement of all items less complete weapons/ equipment be instituted.
- Fiscal autonomy be vested with theatre commanders and a central purchase organisation be established in each theatre.

- Outsourcing of repair and maintenance of weapons/equipment to the private industry to minimise employment of combat manpower in non-core functions and reduce maintenance costs.
- Harness modern technology to enhance visibility of inventory and as aid to decision-making.
- Minimise Layers:
  - Improve lines of communications.
  - Reduce range and depth of inventory.

Structures

Need to modify the structure and bring it in sync with the tri-service operational philosophy, incorporating best practices and exploiting information technology. Incorporate centralised direction, coordination and control within the three wings of the Armed Forces with a single accountable logistics head.

Integrate logistics components within Army, Navy, AF and gradually with the industry, for specific missions to address inadequacies. Undertake planning and execution at the national level for integrated infrastructure development, especially focused on remote border areas.

Establish node for move of heavy transport and equipment, emphasise on containerisation of loads for logistics support to theatres.

Application of Modern Technology for Revolution in S&MC in the Army

A significant leap has been taken by the Army in the field of operational communication. However, such a revolution in S&MC has not yet taken place. Consistent efforts by various services like CICP of the AOC are in progress but majority of supply chain and maintenance functions still await automation. There is currently an immediate need to focus on what is happening on the ground rather than simple theoretical view point. The range of inventory of IA is 5 lakhs items and this makes the automation, a significantly difficult task. However, of all types of inventories, the ammunition inventory is the most important and complex.

Automated Identification and Data Capture (AIDC): Among current technologies, AIDC is the most popular and can be suitably employed for inventory tracking. AIDC will provide enormous benefits in asset visibility and management. This is done in two ways:

Barcode: It is a machine-readable code in the form of numbers and a pattern of parallel lines of varying widths, printed on and identifying a product. Barcodes work through the combination of a symbology (the barcode) and a scanner that can read the symbols and convert them into useful information.

Radio-Frequency Identification (RFID): Relying on geographical information system (GIS), RFID will provide enormous benefits in asset visibility and management. RFID is considered better than barcoding as it enables monitoring of inventory down to every batch. RFID is passive but it still has RF adaptability to different types of ammunition. RFID provided data of stores/equipment, which includes source, manufacturing details, shelf life; assures better response and mission reliability, as real-time information is available to the decision-makers. Certain challenges that need to be successfully tackled for implementation of RFID are:

- Speed up standardisation and codification.
- Integration and automation of systems.
- Cybersecurity and networking.
- Standard operating procedures for tagging.

Enterprise Resource Planning (ERP): ERP is a complete business solution integrated across the entire value chain which creates an information infrastructure for efficient planning and effective execution. The business processes of ERP are required to be customised to meet peculiar requirements of the Army and implementation carefully planned and executed. Customisation cap should be kept at five percent, where as at the moment, it is about 2.5percent. Merger of sales and distribution module with business processes is required. The CICP application has enabled provision review of a range of inventory in one go, reduced timelines for issue and receipt and enhanced availability of inventory to the Army. Three data centres have been established for back-up integration that caters for all possible contingencies. The CICP application design caters for integration with all stakeholders to include the Command HQ, AOC echelons, concerned directorates at IHQ of MoD and Electronics and Mechanical Engineers echelons.

The CICP application has made the procurement decentralised and transparent. Army has now taken to e-trading/e-procurement with

1300 people involved in the same. Ordnance Services (OS) Directorate was nominated as the lead agency for e-procurement in IA in 2014. Director General OS is the chairman of core committee on procurement. Commandant Ordnance Services Computer Centre (OSCC) is the nodal officer. From April 01, 2016 onwards all tenders above Rs. 2 lakhs are being e-procured. Over 84,000 tenders with a value of above Rs. 24,000 crores have been processed. E-trading has enabled faster and enhanced procurement activity. The Government e-market (GEM), which has recently been launched, emphasises adherence to stringent timelines and all payments have to be cleared within 10 days.

Technology is a major enabler. Stand-alone packages implemented by Army, Navy and AF need to be integrated into a single system, which would in turn, ensure seamless integration across and between processes.

Optimum Outsourcing: Industry Perspective

The term outsourcing is derived from the expression 'outside resource using'. In the framework of the Armed Forces, the outsourcing implementation means using of capabilities of the private sector for running such activities that were previously performed solely by the personnel of the Armed Forces/Defence civilians. Outsourcing has become a powerful tool to launch the reform of the Armed Forces and raise the effectiveness of the defence sector all across the globe. The decision to outsource is based on *'Core' and 'Non-Core' activities that determine which activities need to be retained in-house and which can be* given out to the private sector. The Indian Armed Forces need to acknowledge the fact that combatant manpower is a precious resource. Employment of this resource in non-core activities should be avoided as these jobs can be done more efficiently by specialists in that field at comparatively low cost. The industry is well aware of the concerns of the Armed Forces on various issues as listed below:

- Security of sensitive information.
- Reliability.
- Response time.
- Exercising control or lack of it.
- Quality of service.
- Contract management.

Outsourcing: US/UK Defence Forces: The US Armed Forces have carried out outsourcing in Vietnam, Iraq and Afghanistan. In the US Armed Forces, 30–40 percent of the overall services requirements are outsourced. Outsourcing was carried out on large scale by the coalition forces during Operation Desert Storm. The UK Armed Forces have also carried out outsourcing in Falkland War, Iraq and Afghanistan.

The scale of outsourcing has been enhancing ever since. The areas where outsourcing has been carried out by Armed Forces in foreign countries are listed as under:

- Guarding officials, military installations and supply convoys.
- Training local troops and police forces.
- Providing interrogators, translators and transcribers.
- Maintaining and repairing vehicles and aircraft, including the guidance and surveillance systems on tanks and helicopters.
- Driving supply trucks that carry fuel as well as food and supervising supply lines.
- Providing warehousing and storage facilities.
- Setting up Internet access and maintaining computer systems.
- Preparing meals for soldiers.
- Cleaning military facilities, including Army bases and offices.
- Laundry services.
- Building housing.

Outsourcing of Procurement: In the United Kingdom, the procurement was also outsourced to the Private Sector. However, the experience was not encouraging as the cost of procurement got higher by 40 percent, time taken for procurement was 80 percent more and the overall project management was not satisfactory.

Experience of developed countries reveals that outsourcing has to be carried out very thoughtfully and in those areas where immediate and long-term benefits would accrue. The Indian Armed Forces need to study the best practices and carry out analysis of the experience of innovations in the logistics chain, draw valuable lessons and suitably adapt them to the Indian environment.

The industry is well aware of the concerns and sensitivity of the Armed Forces about 'info sharing'. Modalities to address such issues

and ensure security of information can be worked out by the industry and the Armed Forces together. Repair, maintenance and the overhaul of vehicles/equipment, if outsourced, can accrue significant benefits to the Armed Forces in terms of saving manpower, lower cost of services, higher efficiency and high degree of reliability of overhauled vehicles/equipment. Industry may be permitted to use the existing infrastructure facility available in peace areas for carrying out repair/overhaul tasks in the initial stages. Outsourcing can easily be done for construction and maintenance of buildings and estate management. Medical services in peace areas can easily be provided by private industry at much lower costs and higher efficiency.

Operation of high-performance communication and data network is recommended to be outsourced. Private Sector has got immense amount of talent and experience in the field of network management, data handling and communication systems. Complete data management, network and communication systems can be professionally managed by Private Sector at lower costs than what is being incurred by the Govt/Armed Forces as on date.

Training in *IT* and latest technologies, operation of training and simulation centres, catering and transportation services can easily be outsourced. Individual employees who would work on sensitive tasks are recommended to be made subject to Army/Navy/AF Act. The outsourcing will indeed enable Armed Forces to become lean and efficient while focusing energies on the Core Functions.

Transformation in Supply Chain and Inventory Management in the Army

The existing system of Supply Chain and Inventory Management in *the Army is a* legacy system*, left by the British. In the past seven decades, vast improvement in surface communication has taken place, while the industrial base has grown exponentially. There has been nominal reduction in the intermediary links in Supply Chain and limited financial powers delegated.*

The British Armed Forces have adapted their logistics support system in-tune with advancement in technology and strategic analysis to meet changing requirements. However, the IA, being largely a 'status quo'force, has relied more on cosmetic rather than structural changes.

There is, thus, a need to review the system to bring efficiency without compromising assurance level.

The existent structure and system of functioning in the MoD are deep-rooted, inefficient and slow to respond. However, any significant structural change, though desirable and much needed, is very unlikely in the foreseeable future. The Defence Public Sector Undertakings (DPSUs), Ordnance Factories (OFs), Defence Research and Development Organisation (DRDO) and Directorate General of Quality Assurance (DGQA) are all accountable to the MoD and not to the Armed Forces. This has led to an unenviable state where the Armed Forces have a very limited say, though they are the end users. Due to lack of accountability in the bureaucracy and DPSUs, OFB, DGQA and DRDO, the lead time is much more than what is desired and overall satisfaction level is low. As the supplies are not assured, local buffers have been created at all levels in the supply chain to cater to the uncertain environment. Transportation models have been evolved and implemented with a fair degree of success. The budgetary allocation, as known to the environment, is inadequate. However, modernisation with the advent of new technology needs to be ensured.

The acquisition lead time in practice is much more than the time stipulated as per Defence Procurement Procedure. There is a requirement to review the acquisition procedure and allocated time, with the aim to shorten the acquisition lead time and simplify the procedure. The MoD should not act as a monitoring and fault finding agency, which is the case today, but as an equal partner in the entire process. Staffing of certain important appointments (Additional Secretary, Joint Secretary, Directors) in the MoD by Armed Forces officers and personnel will lead to enhanced accountability, greater sensitivity to requirements of the Armed Forces, and thus,will be a positive step towards realistic integration.

The IA has an inventory range of more than 5 lakh items with very restricted visibility of stock levels. Automation of supply chain and inventory management functions in the last 20 years has not yielded desired results. Seeing the potential and talent that is available in the country, the Army ought to have performed better in the field of automation. The Army, in particular, is saddled with an echelon system which increases response time and wastes manpower. There is

an immediate requirement to reduce the links, adopt a lean S&MC and reduce the inventory stock levels while assuring desired response.

Overall, the current status of logistics support in the Army is such that we are 'poor on vision,' 'satisfactory on availability' and 'lack employment of technology in decision-making'. There is an immediate need to absorb enabling technology with a focus on human resource management. The manpower needs to be well trained and efficiency must improve. Rules of employment, discipline and promotion policy must be revisited to enable higher output and ultimately lead to optimisation of manpower in the longer run. We need to gear up to do more with less and improve our response tools.

Limited vendor base is another issue that needs to be tackled urgently. Private Sector participation in design, development and manufacturing is required to be encouraged. In this regard 'Make-in-India in Defence Sector' is a positive initiative and is likely to bring significant dividends in the next two decades. However, we need stable policies to encourage Private Industry to invest more in the Defence Sector. Indigenous equipment induction will ultimately have a significant impact in ensuring better logistics support and will help in reducing stock levels as the assurance levels are likely to improve.

The acquisition lead time must be reduced by carrying out an immediate review of processes and procedures for procurement under both capital and revenue heads. The committees formed for the same should have adequate representation from the Armed Forces.

The current system of compartmentalised procurement, repair and maintenance needs to be replaced with integrated S&MC solution based on life-cycle concept. Automation integration needs to be focused on, for achieving higher efficiency, transparency, visibility and better quality of logistics and maintenance support to the Field Army.

Adoption of Integrated Logistics: Requirement of Changes in Organisations/Structures and Evolving Road Map for Change

In this era of paucity of funds, share of the Armed Forces has continued to reduce from the ideal 3 percent of the gross domestic product to 1.56 percent for the current financial year. In the current scenario, we need to fast-track our efforts to revolutionise the S&MC and gradually

move to integrated single point logistics.

Definition of integrated logistics can be summarised as system-wide management of the entire logistics chain as a single entity instead of separate management of individual logistics functions.

The need to economise is an operational necessity. The global practices and OL that are required are already known. The immediate requirement is to tailor-make our logistics system to the following realities:

- Catering *to a* $2^{1/2}$*front war*.
- L*arge mobilisation challenges through road, rail, air and sea*.
- Orchestration of accretion and reserves.
- Logistics support to various sectors with different operational requirements.
- National infrastructure development.
- Periodic review of placement and storage plans.
- Equipment management (the challenge of huge inventory of 1.2 million, including equipment and their spares).
- Management of single point logistics system.

Lack of Single Point Control: In the Indian Defence Forces, there is lack of a single point control and co-ordination of logistics support functions. However, the advanced nations like the United States, United Kingdom, Russia and China have single point accountability, that is, the responsibility of logistics remains with one vertical. Indian Armed Forces, in contrast, have seven verticals. Though we cannot copy the system of other nations blindly, we can co-opt their 'best practices,' post adaptation to our environment.

UK Model: UK has a Permanent Joint HQ (akin to CDS, as and when it comes into being) which is responsible for force structure, training and manpower management in respective wings of Armed Forces. UK Armed Forces are purely expeditionary in nature; not involved in counter-terrorism, defence of UK home base, strategic nuclear deterrence or North Ireland. The Royal Logistics Corps was formed by merger of the following establishments:

- Transport.
- Ordnance.
- Pioneer.

- Catering.
- Engineers.
- Postal and
- Courier sections.

It is pertinent to note that the Royal Logistics Corps also controls the Defence College of Logistics, Policing and Administration. They started automation early and have joint deployment of inventory which is a single point automated accounting – a pre-requisite for integrated logistics. For procurement and transportation, they involved the Defence Equipment and Support (DE&S) Agency under the PJHQ.

There are five schools that run 410 courses with a cumulative strength of 26,000 students under the Defence College of Logistics, Policing and Administration. These schools of instruction are listed as under:

- Defence Logistics School.
- Defence School of Policing and Guarding.
- Defence Maritime Logistics School.
- Defence School of Transport.
- Defence School of Personnel Administration.

One key takeaway from UK Armed Forces is the model that they follow for movement from strategic base to joint operational areas. They have a concept of 'purple gate', which is the place where Private Sector takes over movement of stores and the agency (coupling bridge) involved is DE&S, which deals with stores from port of embarkation to port of disembarkation.

Current Status: We have, however, not progressed as per plan and there is no single point of coordination and control of logistics. It comes under DCIDS (Operations) under ACIDS (Joint operations). It is certainly not the most optimum way.

The Army has two PSOs namely, MGO and QMG, who handle the logistics. The IAF has a different model with QMG and MGO under Air Officer-ic-Maintenance, while functions of DG Weapons and Equipment (WE) are done by Deputy Chief of the Air Staff (DCAS).

IMMOLS of the IAF and ILMS of the IN have been functional for a long time. Army's CICP has just taken off. The date set for the

two verticals of Aviation and Vehicles to go live is April 30 and that for Ordnance and Ammunition is May 30, 2018. IMMOLS and ILMS have been in use for quite some time. Integrating them with CICP would be a challenge.

Joint Logistics Studies (JLS): A number of JLS were carried out by HQ IDS (2008, 2009, 2010, 2011, 2016 and 2017). If the Codification Study of 2010 does not materialise, half of the efforts of having integrated logistics are not likely to succeed. Four issues have come out in the studies undertaken by the IA in 2001, 2006, 2009, 2014 and 2016 (T3R in 2016 was shelved because of the institution of Shekatkar Committee). These issues are:

- Single logistics head.
- Optimisation.
- Automation.
- Integration.

Joint Logistics Node (JLN): The concept of JLN was envisaged in 2006, starting with 14 nodes and reducing the same to 9. Study team for JLN at Port Blair was constituted in 2016. The report has been submitted in 2017 and the recommendations accepted by all three service chiefs. The work is underway.

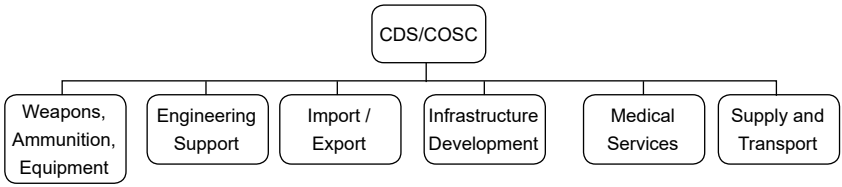
Codification: In India, the codification started in 2008 and in the last 10 years, 30 percent of the items have been codified. At this rate, we may be able to achieve 100 percent codification by 2038 or beyond, by when our inventory would, in all likelihood, swell to 3 million items. The main weaknesses in our system are lack of accountability and inefficient enforcement that we must urgently overcome.

Comprehensive Logistics National Power (CLNP) Grid: We need to move towards having a CLNP Grid by integrating the national logistics system, infrastructure system, and military logistics. Armed Forces have to be a part of CLNP Grid to build up future capabilities and capacities.

The National Transport Development Policy Committee does not have an Armed Forces' representative. That means there would be a Transport Development Council without the Armed Forces' requirements being taken into consideration. Requirements of the

Armed Forces should, by default, get enmeshed into it.

A proposed model for the Defence Logistics Agency with single point logistic head of each service is given as under:



Recommended Way Forward: The following recommendations may be considered:

- A military body to coordinate logistics with the cabinet of ministers at the top and integrated logistics unit at the bottom be established.
- Need to resolve service-specific sensitivities.
- Empowered, single point control—whether at CDS/COSC.
- Establish common logistics procedures and policies.
- Top-driven optimisation of men, material and services, outsourcing or converging wherever possible.
- Automated logistics management on common platforms for seamless visibility of common use items and services.
- Enmesh defence requirements in a 'National Logistics Grid'.
- The National Transport Development Policy Committee to have a defence representative. The transport development council should, by default, take defence needs into consideration.

Reorienting the Higher Echelons of Supply Chain Management

Orientation is essentially a function of the mind. It requires understanding the essentials of logistics and maintenance functions. All major decisions are taken in the IA at the apex level, as the functioning of *IA* is highly centralised. Hence, senior officers, especially those serving at MGO, QMG Branches and WE, OL Directorates, must have adequate experience at various levels in the field formations and IHQ of MoD (Army).

Emphasis must be laid to ensure that the entire process from 'Concept to Completion' should be expedited vigorously and must take lesser time. For instance, the establishment of an Independent Logistics Corps at Port Blair which was conceived in 2007 could be

implemented only after a decade in 2017. Such delays in completion of projects are undesirable and unacceptable. Concerted efforts should also be made to further review/re-examine the timelines outlined in the Defence Procurement Procedure-2016 for capital procurement and bring down the same from 76 weeks (approximately1.5 years) to less than one year.

The IA needs to learn from IAF and Indian Navy, in the field of logistics management and functioning at the higher level. The IN and IAF have logistics heads, who have risen in the logistics chain and have gained reasonably adequate experience in the field.

The IA needs to ensure that the Supply Chain and Maintenance functions get the priority that they deserve. There is merit in considering formulation of a Logistics Staff Stream consisting of all Arms and Services. Officers should be given an option to choose 'Logistics Staff Stream' from Colonel onwards and these officers may serve in MGO, QMG Branches and WE, OL Directorates.

Additionally, reorientation of the senior officers (Brigadiers and above) is recommended to be initiated on priority with specific focus on the following:

- Application of best practices in the field of S&MC management.
- Attitudinal changes to meet the dynamic challenges of S&MC.
- Overcoming resistance to infusion of modern technology in S&MC.

Tail within the Teeth: We also need to consider the aspect of 'Tail within the Teeth'. The hierarchy in the Armed Forces in general and IA, in particular, needs to make a sincere endeavour to optimise manpower by minimising the existing tail within the teeth. The specialist tasks involving QM and MT functions can easily and more efficiently be undertaken by the manpower of services, leaving the combat manpower to focus more on the core functions.

Outsourcing of Supply Chain and Maintenance Functions: This is another important area that needs to be seriously explored by the IA. 'Security-Access-Engagement' is the mantra that needs to be adopted and engagement with the Private Industry should be encouraged. We need to acknowledge that 'Outsourcing' to Private Industry is profit driven. The IA should be able to outsource many of its logistics and maintenance functions and the Private Industry should be able to rise up to the challenge, while also

making reasonable profits in the process.

Inter-Services Integration: The hierarchy in the IA must focus on inter-services integration. Commonality of inter-service communication exists to an extent and integration of communication services can be explored. Individual service heads need to be psychologically prepared to 'let go of their domains', only then integration of logistics can be truly affected.

Reorientation of the officers at the senior level is, therefore, necessary to ensure maximum satisfaction level at the Field Army level. When the MGO, QMG, DGWE and DGOL begin to think like logisticians, the S&MC can be made lean, sustainable and reliable to meet the complex operational needs in today's environment.

Conclusion

Revolution in militarylogistics is long overdue. The Armed Forces in general and the IA, in particular, are required to make a sincere endeavour to bring transformational changes to ensure that a lean, sustainable and reliable S&MC is in place to effectively support operations in the battlefield that has become complex, transparent and multi-dimensional. Adoption of modern technology, outsourcing of non-core activities and reorientation of higher echelons of S&MC are a few measures that would effectively assist in meeting aspirations of the Armed Forces at the Field Level.

CONCEPT NOTE

"My logisticians are a humorless lot ... they know if my campaign fails, they are the first ones I will slay."

— Alexander

"The essence of flexibility is in the mind of the commander; the substance of flexibility is in logistics."

— RADM Henry Eccles, U.S. Navy

Introduction

Successful conduct of war is the art of the logistically feasible. While Revolution in Military Affairs (RMA) has been discussed extensively, Revolution in Military Logistics (RML) has not yet received the desired attention. The aim, therefore, is to debate extent of changes in the field of Military Logistics. An effective Military Supply and Maintenance Chain aims to provide the requisite item and service at the right place, right time, right quantity and in right condition.

Advanced countries like US and UK have transformed procurement procedures by infusion of technology. The Industry brought about a **Revolution in the Supply and Maintenance Chain** by adopting various modern concepts like Anticipatory Logistics, JIT and Third Party Logistics, while the Armed Forces **still remain stuck in an Age Old Archaic System.** The insignificant and incremental changes, over the years by individual Services have not given the desired results.

Transformation in Military Supply and Maintenance Chain is long overdue. While the aspects of security, reliability and response continue to be important factors in considering the quantum of changes and methodology, but these factors must not hold us back from adopting an integrated, flexible, responsive, efficient and effective Supply and Maintenance Chain working on the principle of sense and respond. Blind adoption of logistics concepts of industry may not meet the requirement of the Armed Forces. JIT does not work during

continuous offensive operations. Hence, the Services need tailor made logistics system based on best practices of the industry and those inherited by us.

Application of Modern Technology for Revolutionising Supply and Maintenance Chain in the Army

A significant leap has been taken by the Army in the field of operational communication. However, such a revolution in Supply and Maintenance Chain communication has not taken place. Real time tracking of consignments and asset visibility is missing. Individual efforts by various services like Computerised Inventory Control Project (CICP) by the AOC are in progress but most Supply Chain and Maintenance functions still await automation. At times the application of modern technology gets hindered due to security related issues. Application of following technologies may be considered:

- **Introduction of RFID**: RFID, relying on the GIS (Geographical Information System) will provide enormous benefits in asset visibility and management. RFID provided data of stores/ equipment assures better response and mission reliability as real time information is available to the Decision Makers. Certain challenges that need to be successfully tackled for implementation of the RFID are:
  - Speed up standardization and codification.
  - Integration and automation of systems.
  - Cyber security and networking.
- **Enterprise Resource Planning (ERP)**. Stand alone packages implemented by some of the individual services need to be integrated into a Single System, ensuring seamless integration across and between processes. The business processes of ERP are, however, required to be configured/ customised to meet peculiar requirements of the Army and implementation carefully planned and executed.

Optimum Outsourcing: Industry Perspective

The Armed Forces need to acknowledge the fact that combatants should not be employed in jobs that can be done more efficiently by specialists in that field at comparatively low cost. Till recently, we continued to have military farms despite having 'White Revolution'.

We breed horses and mules when the country's Equine industry is well developed.

Focus on international best practices and analysis of the experience of innovations in the Supply and Maintenance Chain in the industry is a viable option, to draw valuable lessons and assess suitability to the Indian environment. Outsourcing of non-core functions viz transportation, catering, uniforms & accessories, repair & maintenance of vehicles/ equipment, construction & maintenance of buildings, warehousing, training in IT & latest technologies may be considered, to set free a significant quantum of resources. Keeping in mind security and quick response, there is a need to continuously review areas where outsourcing is feasible, in the non-core activities and enable the Industry to enhance contribution to National Security.

Transformation in Supply Chain and Inventory Management in the Army

At the time of independence, the mandate was to hold 180 days of War Wastage Reserves (WWR) due to under-developed industrial base and communication network. With industrial development the reserve stock levels were initially reduced to 90 days and later in 1979 to 60 days. Finally, in 2010, it was changed to 40 days at intense rate. In the past seven decades India has experienced improvement in surface communication while the industrial base has grown exponentially. There has been nominal reduction in intermediary links in the Supply Chain and limited financial powers delegated. However, there is a need to further review the system to bring efficiency without compromising the assurance level. Some of the changes that may be considered are:-

- Adopt a Lean Supply and Maintenance Chain with fewer links, reduced stock levels, quicker and assured response.
- Review of processes and procedures for procurement under both capital and revenue heads.
- **Transform Equipment Management**. The current system of compartmentalised procurement, repair & maintenance needs to be replaced with **Integrated Supply and Maintenance Chain** solution based on Life Cycle Concept.

Adoption of Integrated Logistics: Requirement of Changes in Organisations / Structures and Evolving Road Map for Change

In this era of paucity of funds, share of the Armed Forces has continued to reduce from the ideal 3% of GDP to 1.56% for the current financial year. While efforts to seek fair share for ongoing modernisation and capability enhancement must continue, we also need to fast track our efforts to revolutionise the S&MC and gradually move to Integrated Single Point Logistics. For enabling seamless execution, closer interaction, prevention of duplication of work and achieving right sized services & staff, the existing compartmentalised structures in the current system need to be suitably integrated.

Need of the hour is to review the existing organisational structures, both at the Integrated HQ of MoD (Army) and the Defence Ministry. A strong case exists for induction of service officers in the ministry (i.e. at the level of Special/ Additional Secretary, Joint Secretary & Directors) with the aim to bridge the civil-military gap, speed up the procurement cases for force modernisation and better accountability. The resistance to change must be overcome and steps initiated to achieve integration through optimisation.

Tail within the Teeth: All combat Arms (the Teeth) have certain service component (the Tail) in all units and formations. While the Shekatkar Committee (the Committee of Experts) has given specific recommendations to reduce the flab within the services, the **Tail within the Teeth (service component within combat units/ formations) has been left out**. With automation of office functioning, Quartermaster stores management and improved repair/ maintenance facilities, there is a need to have a re-look at the entire issue with the view to optimise manpower. The resource so optimised could be utilised for new raisings or meeting other operational requirements to enhance combat potential of the Army.

Are the Armed Forces ready to embark on the road to change? The question needs to be debated and deliberated upon and a roadmap for change evolved to meet the future operational and logistics challenges.

Re-orienting the Higher Echelons of Supply Chain Management

Major decisions are taken at the apex level in the Indian Army. Senior officers involved in such decision making must have adequate

experience in the logistics appointments at the IHQ of MoD (Army) and field formation level. The Indian Navy and IAF have logistics heads, who have risen in the logistics chain and have adequate experience in the field. In order to ensure that the Supply Chain Management gets the priority that it deserves, there is merit in considering officers selection from colonel onwards for Logistics Staff Stream (all Arms & Services) who may serve in MGO & QMG Branches and OL & WE Directorates. Re-orientation of the senior officers (Brigadiers & above) may be initiated and following issues focused upon:

- Application of best practices in the field of S&MC Management.
- Attitudinal Changes to meet the dynamic challenges of S&MC.
- Overcoming resistance to infusion of modern technology in S&MC.

Conclusion

The topic of this seminar, viz, "Revolution in Mil Logistics: Lean, Sustainable, Reliable Supply and Maintenance Chain", was specifically chosen for its relevance in the present context wherein there is an acknowledged need for the Armed Forces in general and Army in particular to move towards a more lean, reliable, responsive, joint and dynamic Supply and Maintenance Chain. The seminar attempts to weave together a comprehensive World View from the varying and diverse strands of all stake holders to gain valuable insights on the subject and evolve a roadmap for transformation in the existing Supply and Maintenance Chain.

The under mentioned issues will be covered during the course of the seminar:

- Application of Modern Technology for Revolutionising Supply and Maintenance Chain in the Army.
- Optimum Outsourcing: Industry Perspective. (Focus on International Experience and suitability to Indian Environment)
- Transformation in Supply Chain and Inventory Management in the Army.
- Adoption of Integrated Logistics: Requirement of Changes in Organisations / Structures and Evolving Road Map for Change.
- Re-orienting the Higher Echelons of Supply Chain Management.

PROGRAMME

1000h-1030h	**Tea and Registration**
1030h-1040h	**Welcome Remarks** : Lt Gen BS Nagal, PVSM, AVSM, SM (Retd), Director CLAWS
	SESSION – I
1040h-1050h	**Chairman's Opening Remarks** – By Lt Gen RC Chadha, PVSM, AVSM, VSM (Retd)
1050h-1110h	**Application of Modern Technology for Revolution in Supply and Maintenance Chain in the Army** – By Col SS Balaji, Comdt OSCC
1110h-1130h	**Optimum Outsourcing: Industry Perspective** **(Focus on international experience and suitability to Indian environment)** – By Col RS Sirohi (Retd), DGM Defence, Ashok Leyland
1130h-1150h	**Transformation in Supply Chain and Inventory Management in the Army** – By Maj Gen PM Singh, ADG ST (SM)
1150h-1210h	**Interactive Session**
1210h-1230h	**Tea Break**
	SESSION – II
1230h-1240h	**Chairman's Opening Remarks** – By Lt Gen Balbir Singh Sandhu, AVSM, VSM (Retd)
1240h-1300h	**Adoption of Integrated Logistics: Requirement of Changes in Organisations / Structures and Evolving Road Map for Change** – By Maj Gen Rajesh Chaba, ADG OL
1300h-1320h	**Re-orienting the Higher Echelons of Supply Chain Management** – By Lt Gen Subrata Saha, PVSM, UYSM, YSM, VSM**** (Retd)
1320h-1340h	**Interactive session**
1340h-1350h	**Closing Remarks** : Lt Gen BS Nagal, PVSM, AVSM, SM (Retd), Director CLAWS
1350h	**Lunch and Dispersal**