

“EVOLUTION OF MILITARY ENGINEERING AND MILITARY CONTRIBUTION TOWARDS SUSTAINABLE DEVELOPMENT IN SRI LANKA”



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SEQUENCE

- Introduction
- Historical Evolution of the Military Engineering Concept
- Military Engineering Units of Sri Lanka Armed Forces
- Contribution of Military Engineering for the conflict against LTTE
- Contribution of Military Engineering aftermath of the conflict in Sri Lanka
- Present contribution of the Military Engineering for the Nation Building and Sustainable Development
- Defence Engineering
- Conclusion



INTRODUCTION

What is Military Engineering?

- Art and practice of designing and building military works and of building and maintaining lines of military transportation and communications.
- Oldest form of engineering / precursor of the Civil Engineering discipline.
- The term derived from the need of a separation between military and non-military engineering fields.
- Military engineers serve servicemen on war-fronts and during peace time.



MILITARY ENGINEERING

3 x functions

Combat Engineering

- Improve the mobility of own troops
- Hinder the mobility of enemy troops



MILITARY ENGINEERING

General Engineering

- Ground mobility construction
- Air Field / Sea Port construction
- Contingency location facility construction



WAR

PEACE

MILITARY ENGINEERING

Civil Engineering

Design, construct and maintain all military buildings, roads and associated facilities such as electricity, water supply and drainage systems.

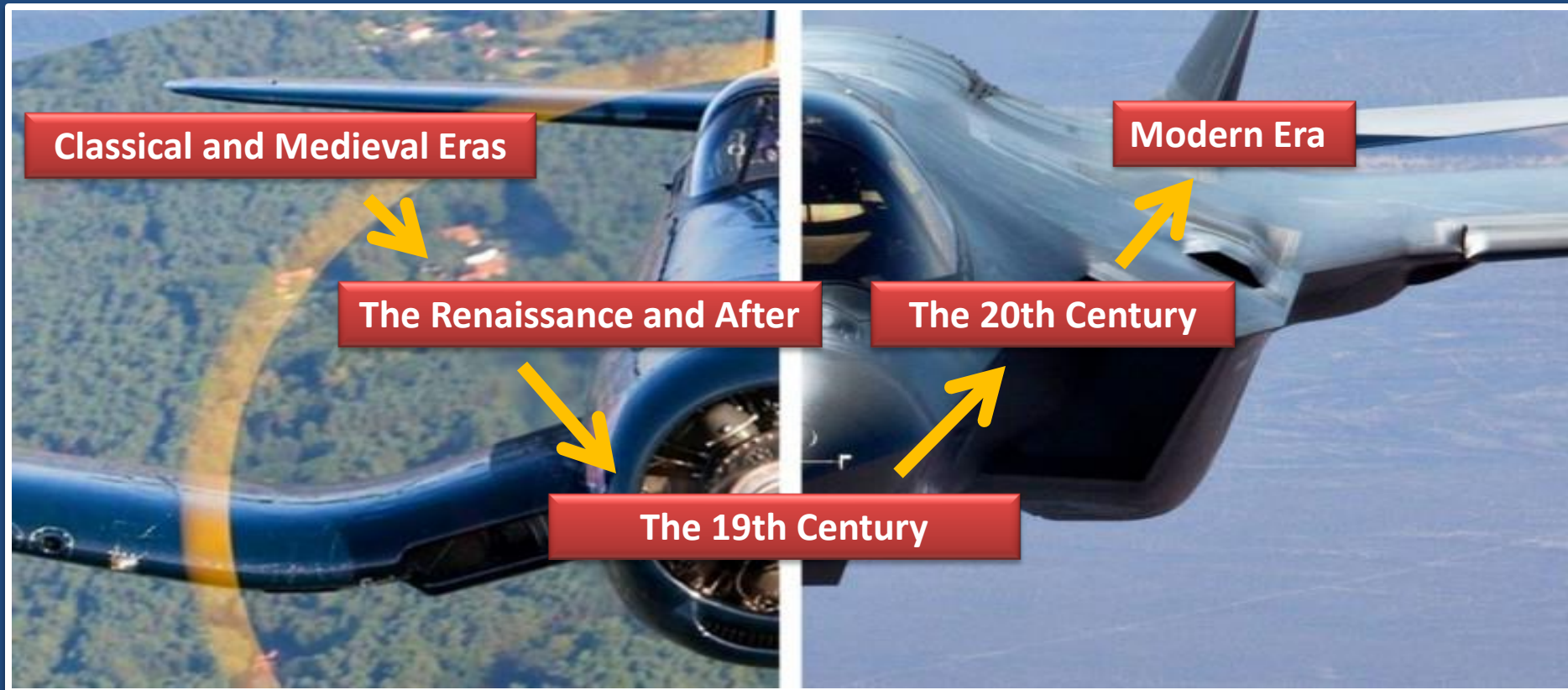


WAR

PEACE

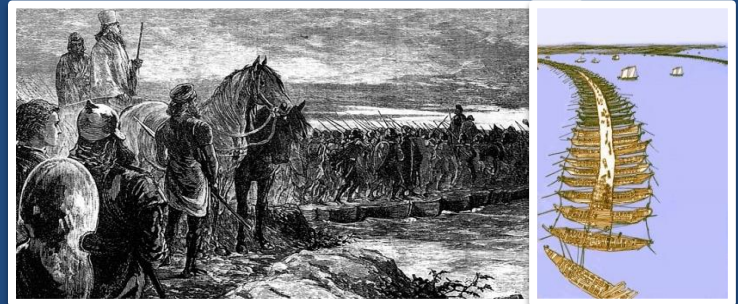
HISTORICAL PERSPECTIVES; EVOLUTION OF THE CONCEPT

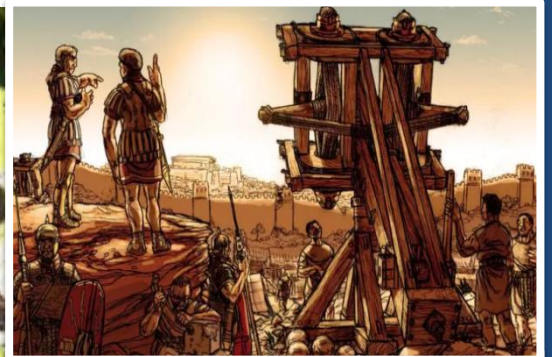
Evolution of Military Engineering can be studied under 5 eras;



CLASSICAL AND MEDIEVAL ERAS

- Evidence of the work of the earliest military engineers; *Hill forts* in Europe during the late Iron Age
- Pontoon bridges built by engineers of the Persian King Xerxes
- Great Wall of China





castra, -ōrum



The Romans; preeminent military engineers of the ancient Western World

THE RENAISSANCE ERA AND AFTER

- The development of powerful cannons in the 15th Century brought about a reappraisal of fortification design and siege warfare in Europe and parts of Asia.
- Defence Engineering with regard to fort protection also enhanced.



Bastioned Trace



Sébastien Le Prestre de Vauban

THE 19th CENTURY

- Technological advances changed the nature of military engineering in the century following the Napoleonic Wars.
- British and French military engineers first used the *Electric Telegraph* in the Crimean War (1853–56).
- With the spread of railways, military engineers had many responsibilities.



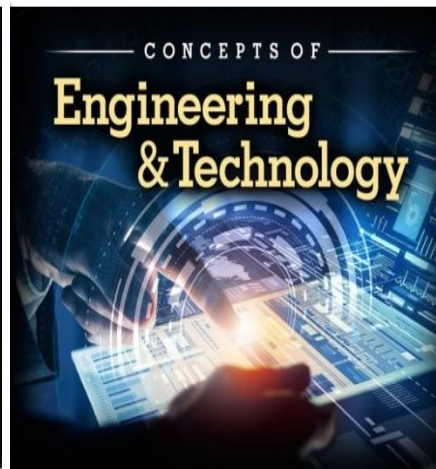
THE 20th CENTURY

- The protracted trench warfare of World War I changed traditional siege craft skills of the military engineers.
- At the end of WW1, military telecommunication engineers became a separate corps in all Armies.
- Mine laying is a sub specialty of military engineering that acquired increased importance in the 20th Century.



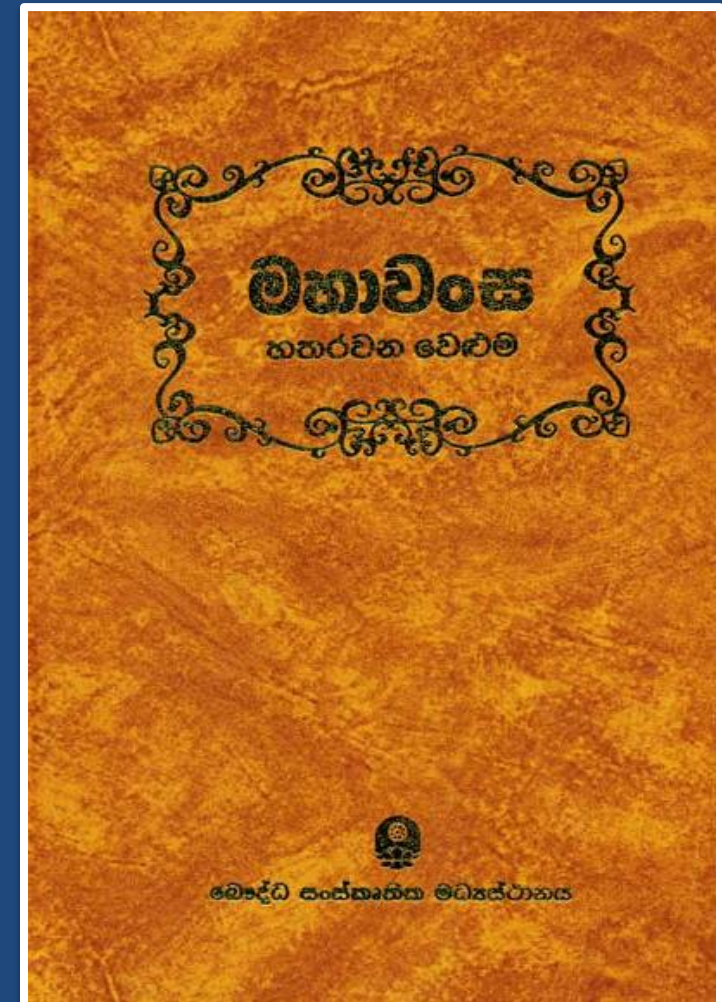
MODERN ERA

- In 20th and 21st Centuries, military engineering included other engineering disciplines.
- Today's military engineering demands variety of fields to cater for modern threats and challenges of warfare.
- Technology has become an integral part of engineering, with no exception to Defence sector.



HISTORY OF MILITARY ENGINEERING ; SRI LANKAN CONTEXT

Military engineering has been involved in ancient Sri Lankan wars and reported in many historical documents.



- Ancient literature describes the force of Pussadeva's arrow which highlights the state of weapons engineering.

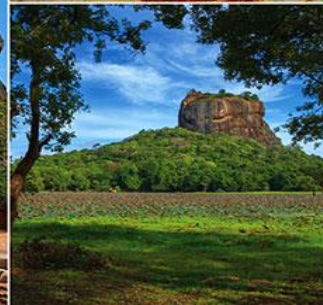
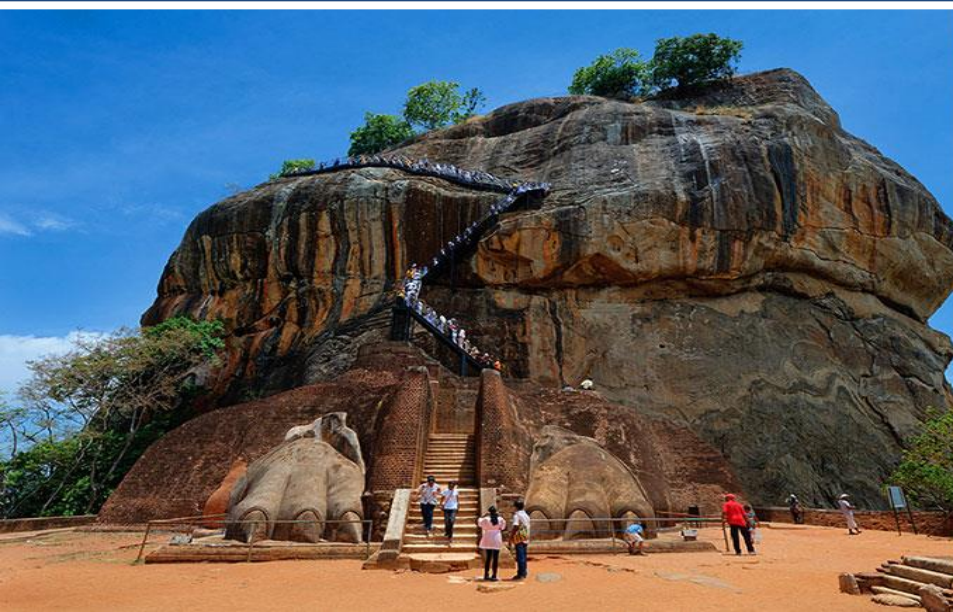
“a shot go through a cart filled with sand, as well as through hides a hundred-fold thick ; through an Asoka plank eight inches, an Udumbara plank sixteen inches thick, as well as a plate of iron, and a plate of brass four inches thick”

-Henry Parker / Ancient Ceylon-

- The work of the Sinhalese armourers elicited great praise from Europeans.



- Sigiriya fortress is a classic example of fine military engineering work of ancient Sri Lanka.
- The technology used was much advanced.



ENGINEERING UNITS OF SRI LANKAN MILITARY

- Ceylon Engineers was formed as a part of Ceylon Defence Force and was formed in 1911 and engaged in Combat Engineering tasks of Army (War fighting tasks).
- Corps of Engineer Service Regiment was born in 1950 and responsible for Civil Engineering tasks of the Army.
- Corps of Signals is responsible for providing military communications, information technology and electronic warfare support to the Army.



- Sri Lanka Electrical and Mechanical Engineers Regiment is responsible for repair and maintenance of all electrical, mechanical biomedical and optical equipment in the Army.



- Sri Lanka Air Force: Aeronautical Engineering Unit.



- Sri Lanka Navy : Marine Engineering Unit.



CONTRIBUTION OF THE MILITARY ENGINEERING UNITS FOR NATION BUILDING AND SUSTAINABLE DEVELOPMENT

- Contribution made during the conflict with LTTE.
- Contribution made aftermath of the conflict.
- Contribution in the present day context.



CONTRIBUTION OF THE MILITARY ENGINEERING DURING THE CONFLICT

- Construction of roads for provision of supply and transport to the advancing troops.
- Blocking of enemy`s advance by mine laying, demolitions, traps.
- Disposal of mines / clearing of mine fields.
- Construction of temporary bridges.
- Construction of temporary shelters for troops.
- Supply of water.
- Supply of electricity.
- Construction of sanitary facilities.
- Provision of communication for combat troops.
- Maintaining of information systems in the battlefield.
- Provision of repair facilities to all military vehicles in operations and administration duties.

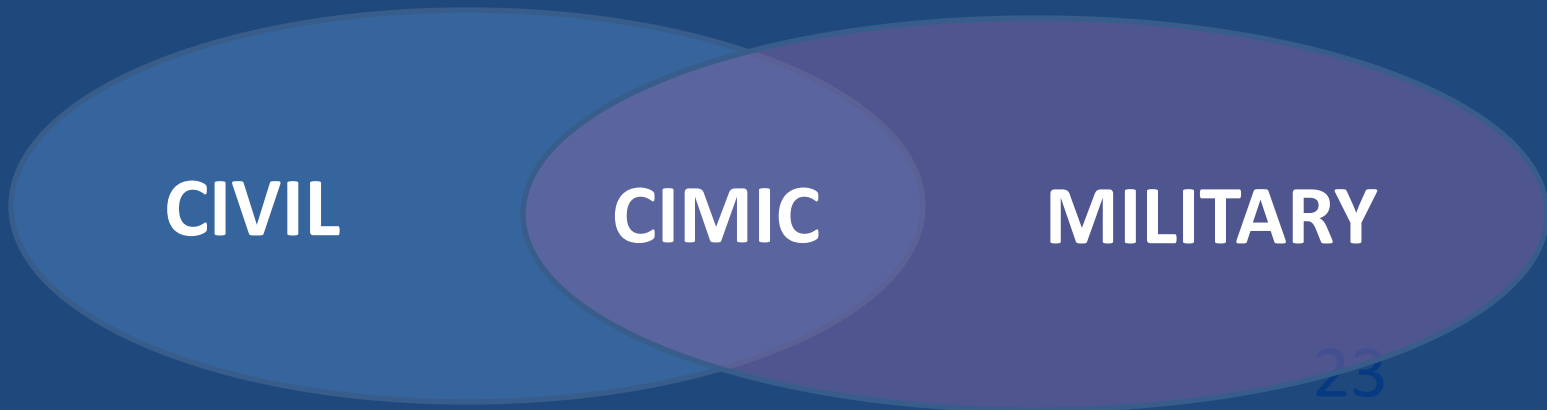
CONTRIBUTION OF THE MILITARY ENGINEERING AFTERMATH OF THE HUMANITARIAN OPERATION

- After the conflict, there was a need for a comprehensive recuperation of deeply fractured community in North and East.
- Military was demanded to function as multi-force tool under:
 - CIMIC - Civil Military Cooperation
 - MACA - Military Aid to Civil Authorities



WHAT IS CIMIC ?

Civil-Military Cooperation (CIMIC) is the means by which military components connect with civilian agencies actively in a theatre of operations, may be during or aftermath of a conflict.



WHAT IS MACA ??

Collective term used to refer to the operational deployment of the Armed Forces in support of the civilian authorities, other Government departments and the community as a whole.



TYPES OF ASSISTANCE IN MACA

- Military Aid to Civil Ministries (MACM)
- Military Aid to Civil Power (MACP)
- Military Aid to Civil Community (MACC)



CONTRIBUTION OF MILITARY ENGINEERING AFTERMATH OF THE CONFLICT









The freedom to grow independently



POST-CONFLICT CHALLENGES

- Accommodating and ensuring the welfare of nearly 300,000 Internally Displaced Persons.
- Undertaking the demining and the reconstruction of infrastructure and facilities in affected areas.
- Resettling the Internally Dispersed Personnel (IDPs) .
- Rehabilitating nearly 12,000 ex-LTTE cadres and Reintegrating them into the peaceful society.

5R CONCEPT

REHABILITATION

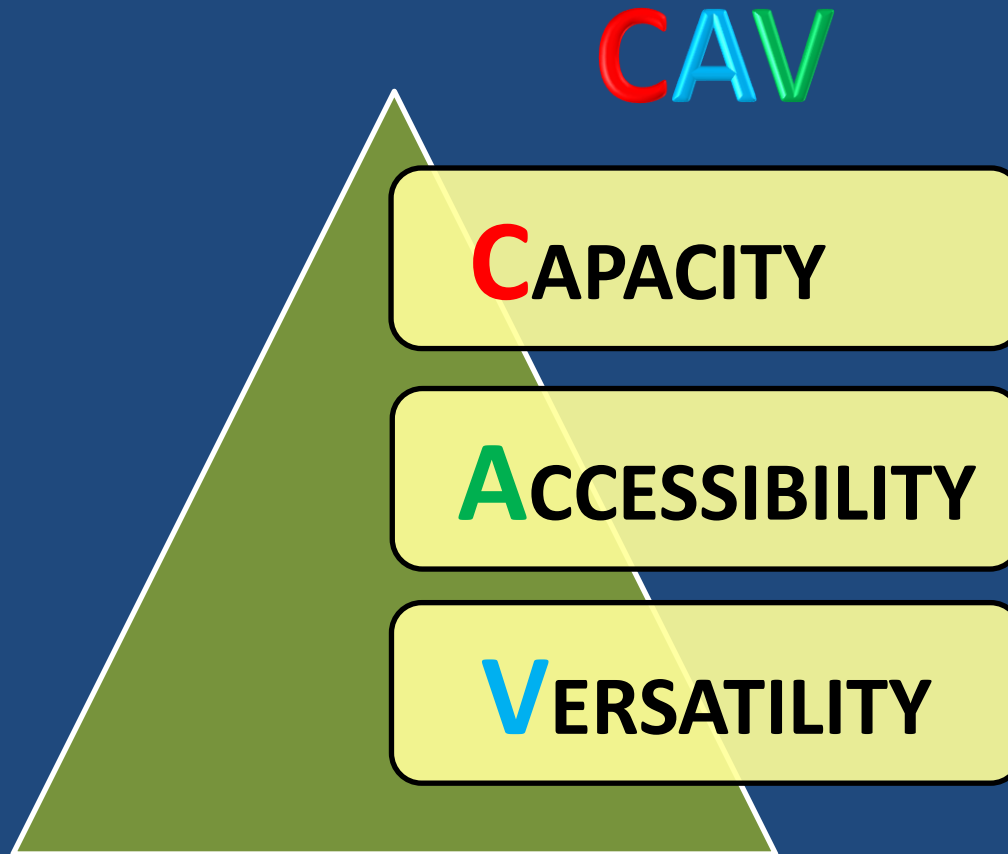
RECONSTRUCTION

REINTEGRATION

RESETTLEMENT

RECONCILIATION

- Why did the military engage in the Reconciliation Process?



- Is the engagement of the military in the Reconciliation Process justified?

Yes, military was engaged within the provisions of the law of the land that provides for the military to assist the civil authorities.





5R – REHABILITATION

Approximately, 12,000

Ex-Combatants



Disciplined Civilians







5R – RECONSTRUCTION





A significant shift in the “*mode of operation*” of the Armed Forces



Demining of nearly 5,000 square kilometres by Armed Forces



Resettlement of nearly 300,000 Internally Displaced Personnel was an enormous challenge



Immediate and development needs of the population were attended by Armed Forces



Immediate and development needs of the population were attended by Armed Forces

CONSTRUCTION OF TEMPORARY & PERMANENT SHELTERS



CONSTRUCTION OF NEW HOUSES



CONSTRUCTION OF SCHOOLS & EDUCATIONAL INSTITUTES



CONSTRUCTION/ RENOVATION OF RECREATIONAL FACILITIES



RECONSTRUCTION OF HOSPITALS & MEDICAL FACILITIES



PROVISION OF WATER & SANITARY FACILITIES



RENOVATION OF RELIGIOUS PLACES



ASSISTANCE IN CONSTRUCTION & RENOVATION OF ROADS & TRACKS



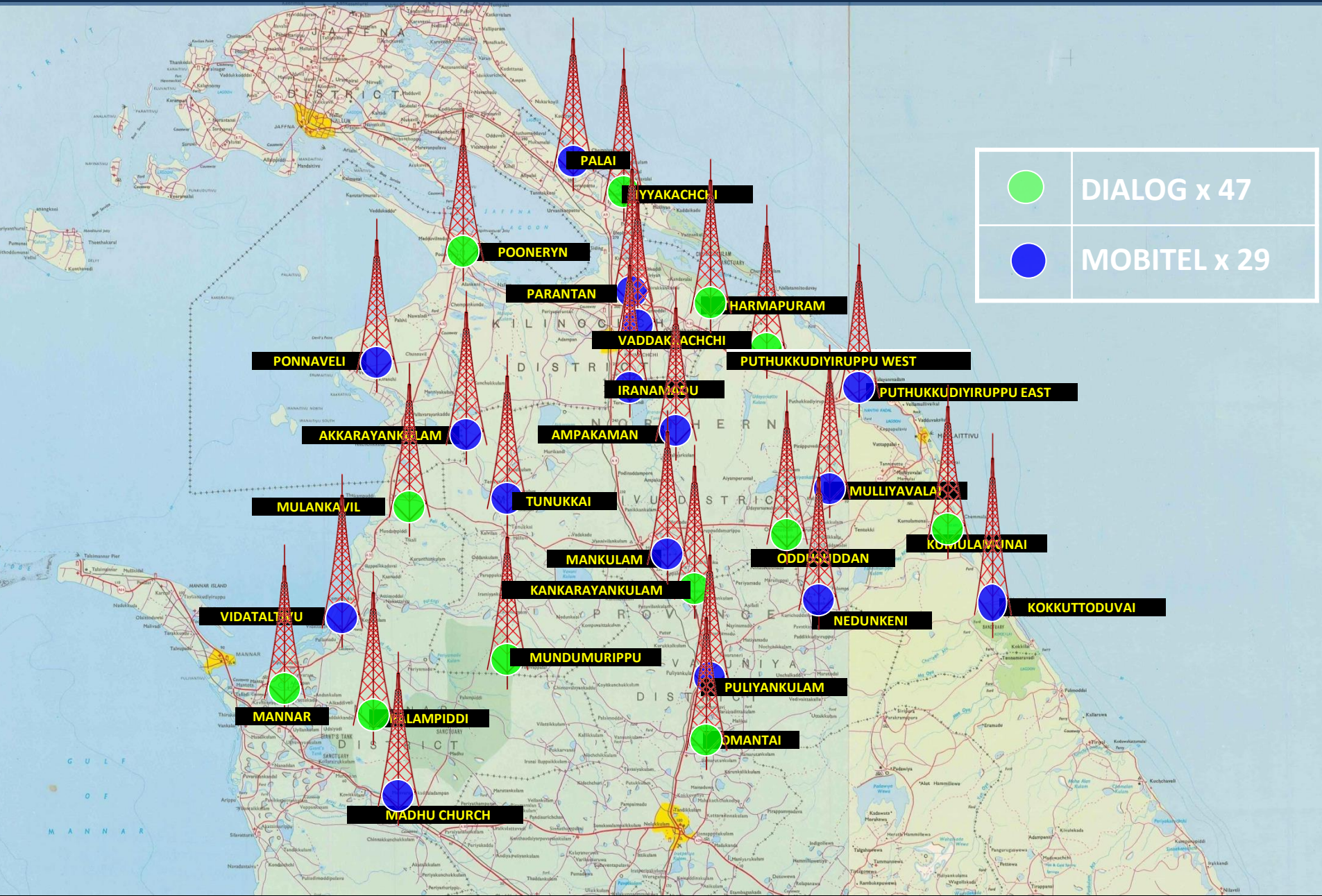
ASSISTING ELECTRICITY POWER PROJECTS



BUILDING COMMUNICATION FACILITIES



COMMUNICATION INFRASTRUCTURE DEVELOPMENT PROJECT WITHIN NEWLY LIBERATED AREAS



REPAIRING OF BRIDGES & CULVERTS



RENOVATING OF IRRIGATION CANALS & TANKS



5R – REINTEGRATION





Terrorist`s Family - Mahaveer



Armed Forces played the major role in social integration



Life returned to normalcy with hopes...!



The changes were real...!

5R – RESETTLEMENT







5R – RECONCILIATION



NORMALCY



**CIVIL
ADMINISTRATION**



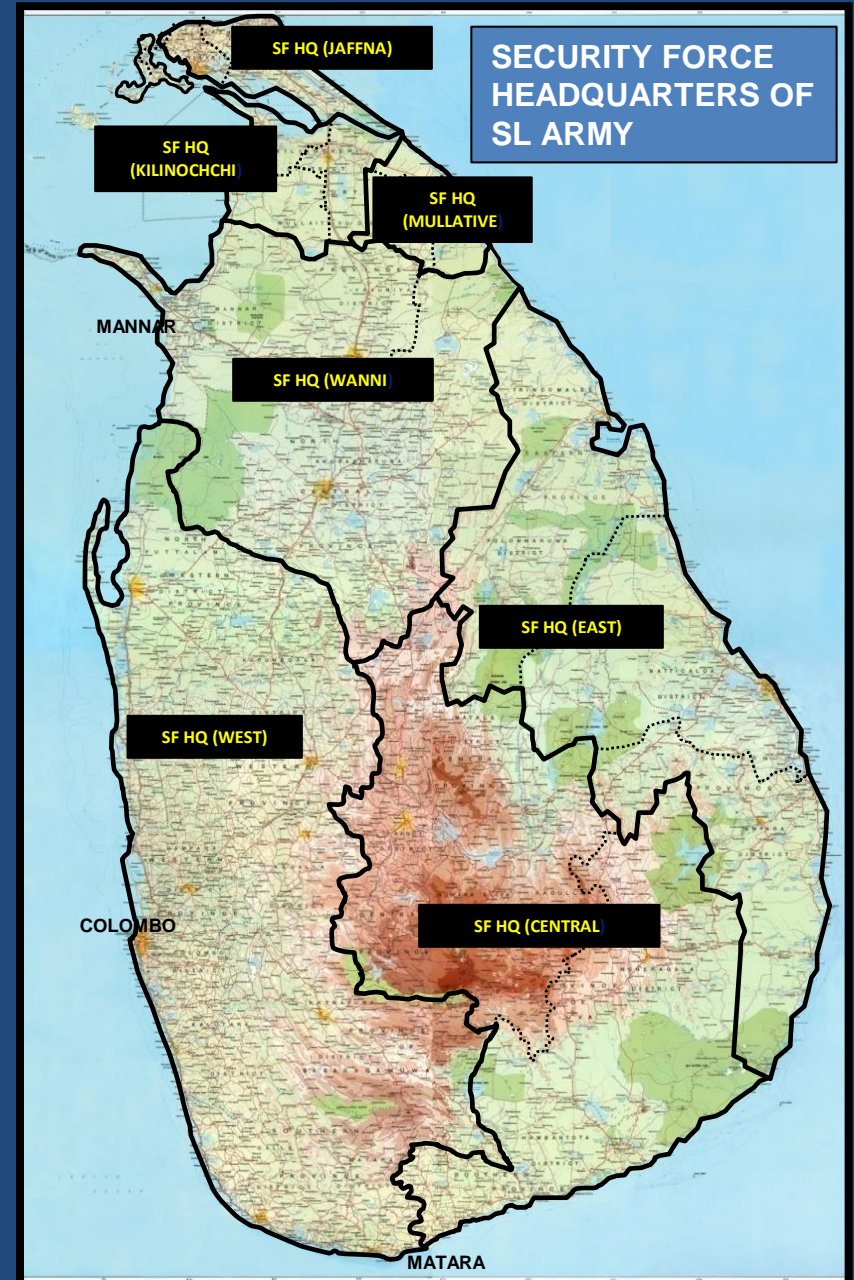
Sri Lankan model of reconciliation by Armed Forces is an unsurpassable example with other cases found in the world affairs.

PRESENT CONTRIBUTION OF THE MILITARY TOWARDS SUSTAINABLE DEVELOPMENT



At present, Tri Forces are throwing their full weight behind national level campaigns aiming Nation Building and assisting in achieving Sustainable Development.

- The efforts are launched through 7 Security Force Headquarters deployed in the country.
- Mammoth development projects are being carried out by Tri Forces.
- Projects are funded by the Tri Forces/ project proposers.



CONSTRUCTION OF MEDICAL FACILITIES



Accommodation facility building for Kidney patients (Methsiri Sewana) – Anuradhapura, built by SL Army.



Construction of Kidney Research Center at Medawachchiya



Construction of OPD at Kytes



Construction of Kidney Hospital at Kandy

CONSTRUCTIONS IN PUBLIC TRANSPORT SECTOR



Construction of “Senehasaka Thotupola” Railway Station - Elephant Pass



Construction of 57 x bus stops in Colombo city

CONSTRUCTION OF EDUCATIONAL FACILITIES



Construction & Renovation of Defence School



Construction of Open Theater at University of Moratuwa



Renovation of Mathematics Section Building of the University of Colombo

SPORTS AND LEISURE



Upgrading Race Course Ground as an International Rugby Stadium



Renovation of Main Pavilion of the Race Course Ground



Renovation of Sports Ministry Building



Renovation of Mini Auditorium and Vehicle Park at Race Course



National Museum Conservation Project



Construction of Homagama Fair



Construction of a new shopping complex at Bastian Mawatha, Colombo

CONSTRUCTION OF PUBLIC PLACES



Town Development Project - Kurunegala



Construction of Divisional Medical Officer's Office -
Maruthankeni



Construction of Defence Headquarters Complex, Akuregoda



RO Plant Project for drinking water by SL Navy



Commander`s Housing Project of Sri Lanka Air Force



Construction of University Hospital KDU

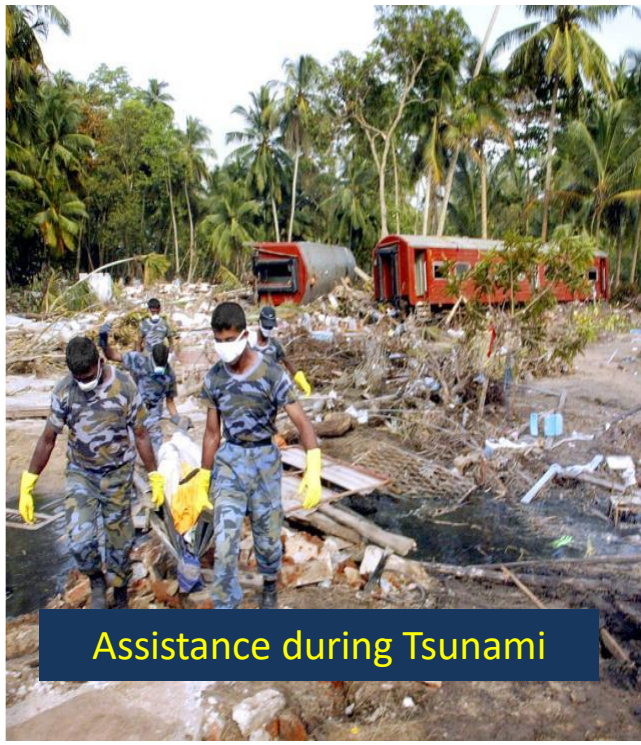


Construction of Sandahiru Seya

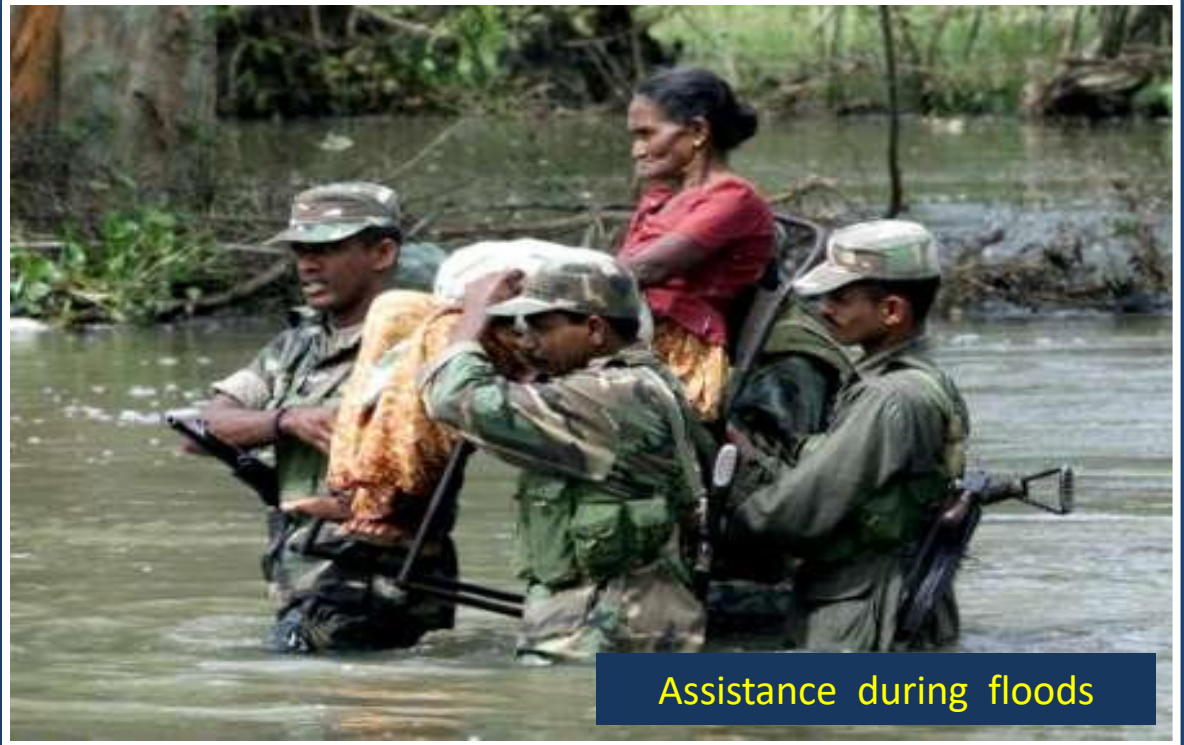
HUMANITARIAN ASSISTANCE DURING DISASTER RECOVERY



Quick and rapid deployment of military in the event of large-scale national disasters and catastrophes have repeatedly proven in many past incidents.



Assistance during Tsunami



Assistance during floods



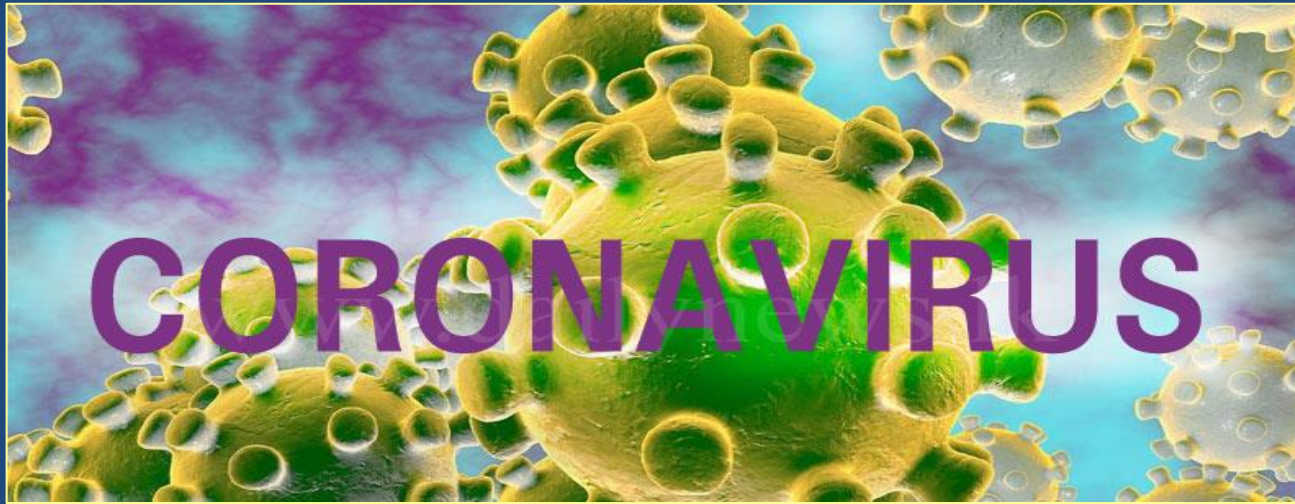
Assistance during garbage Slides



Assistance during the Landslides
Meethotamulla / Aranayaka



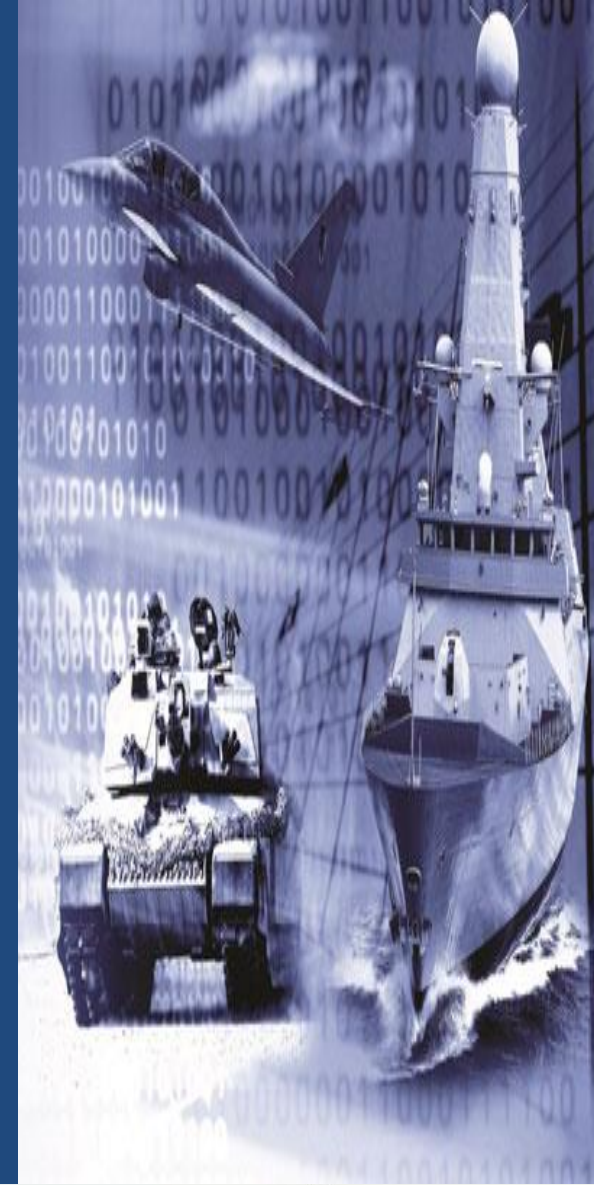
Assistance during
floods



The latest ...

DEFENCE ENGINEERING

- Defence Engineering focuses on the development and production of technology.
- Performed mainly by civil organizations and research and development entities.
- Different from military engineering as Defence Engineering focus to provide technological solution to the battle field.



Centre for Research and Development is the Defence R & D organization which was established in the year 2006.

Engineers serving at the CRD, has managed to develop many high tech defence productions for Tri Forces of Sri Lankan military during the conflict and at present.



CONTRIBUTION OF CENTRE FOR RESEARCH & DEVELOPMENT OF THE MINISTRY OF DEFENCE FOR DEFENCE ENGINEERING



TRI FORCES RESEARCH AND DEVELOPMENT UNITS

- Tri Forces Research and Development units have also been established.
- SL Army “Innovata” Annual Exhibition/ Competition” and other R&D projects are timely endeavors to support “Innovative Engineering for Sustainable Development.
- Tri Forces have participated consecutively for last three years at the premier national engineering and technology exhibition - techno 2017, 2018 & 2019.



CONCLUSION



GENERATIONS OF WARFARE



- 1 GW** : Line & Column Warfare (Classical battles fought with massed manpower)
- 2 GW** : Trench Warfare (Early-modern period, use of rifles and breech-loaded weapons, WW I)
- 3 GW** : Maneuver Warfare (Late-modern era, use of high speed outmaneuvering capabilities, WW II)
- 4 GW** : Insurgent Warfare (Any war in which one of the major participants is not a state but rather a violent non-state actor)
- 5 GW** : Unrestricted Warfare (Population, Culture & Morality would become the target)



Cyber Warfare will dominate the future giving more significance to Electronic, Electrical and Cyber fields

THANK YOU...!