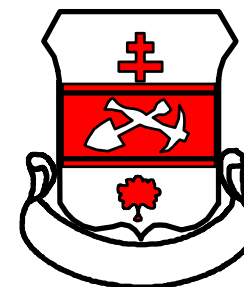
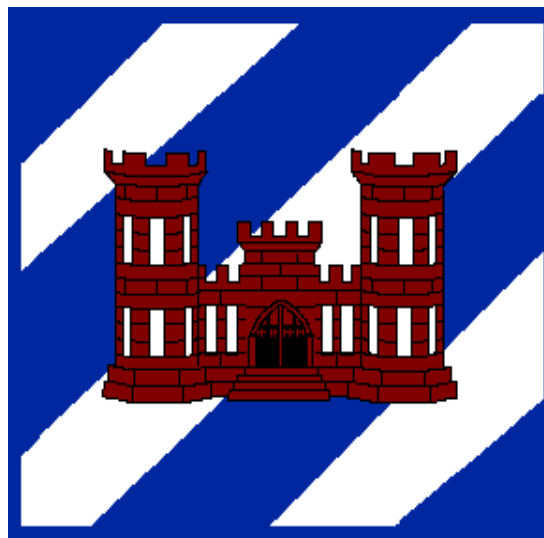


3d INFANTRY DIVISION (M) ENGINEER BRIGADE



SAPPER STEEL!

**DIVENG OPFOR
BATTLEBOOK**

UNCLASSIFIED

1 December 1998

***ENGINEER BRIGADE
MISSION***

Deploy rapidly to a contingency area by air, sea, and land; protect the force; and provide continuous combat engineer support for mobile, combined arms offensive and defensive operations.

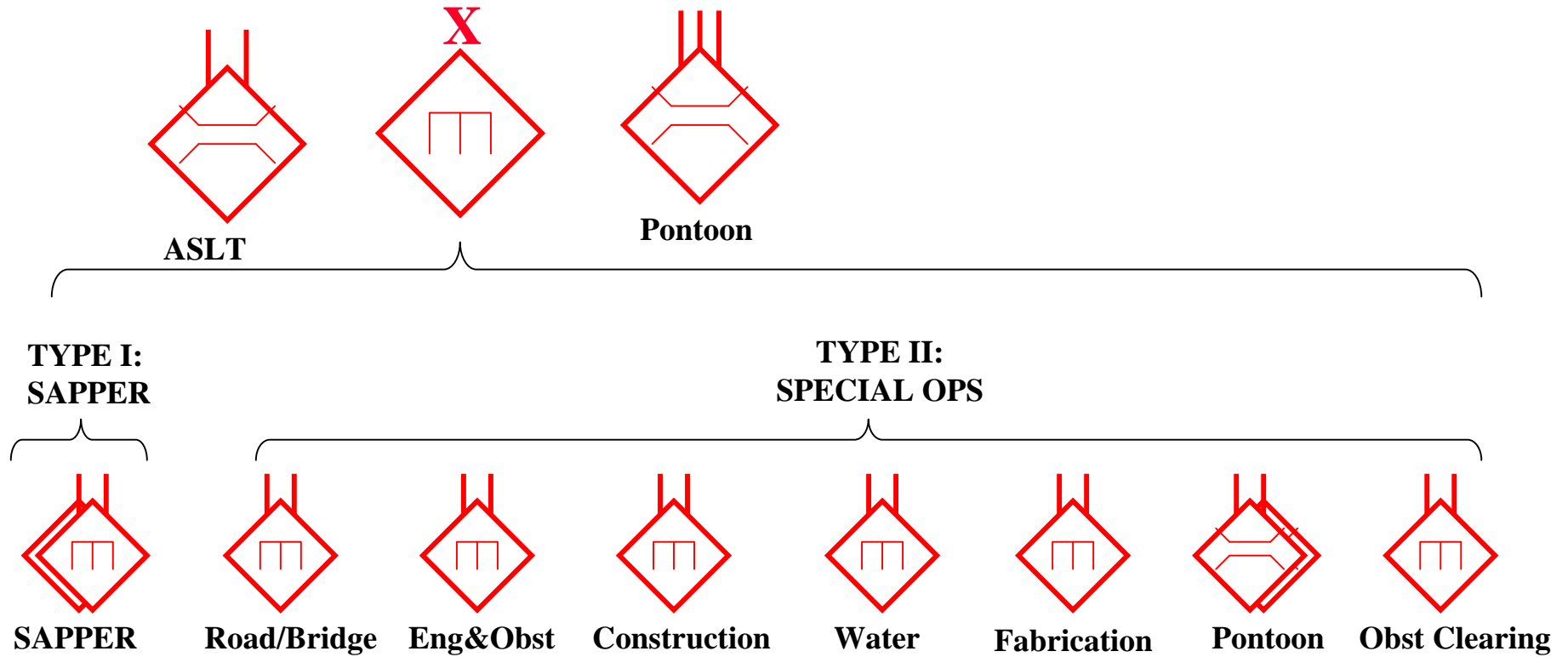
Table of Contents

- Organization (pg 4)
- Offense (pg 34)
- Defense (pg 40)
- Mine Warfare(pg 44)
- Bridging (pg 54)
- Mobility (pg 72)
- Countermobility (pg 82)
- Survivability (pg 92)
- FASCAM (pg 96)
- Vehicles&systems (pg 102)

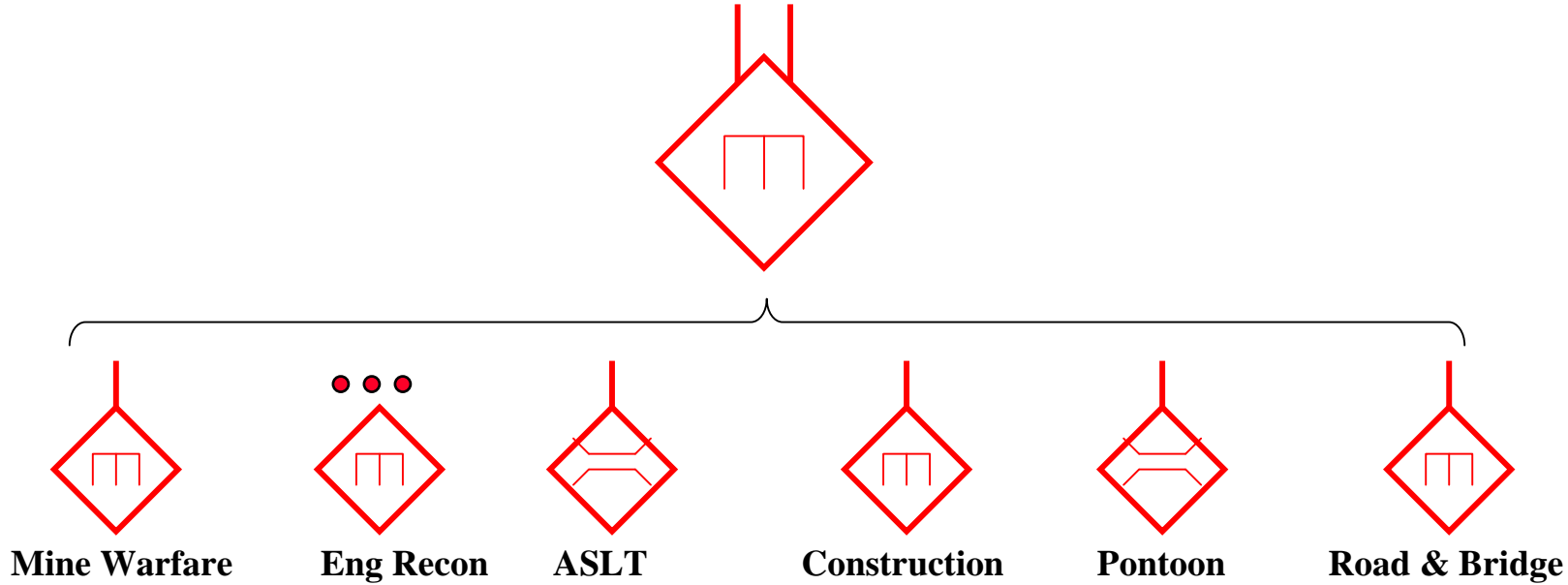
Generic Organization



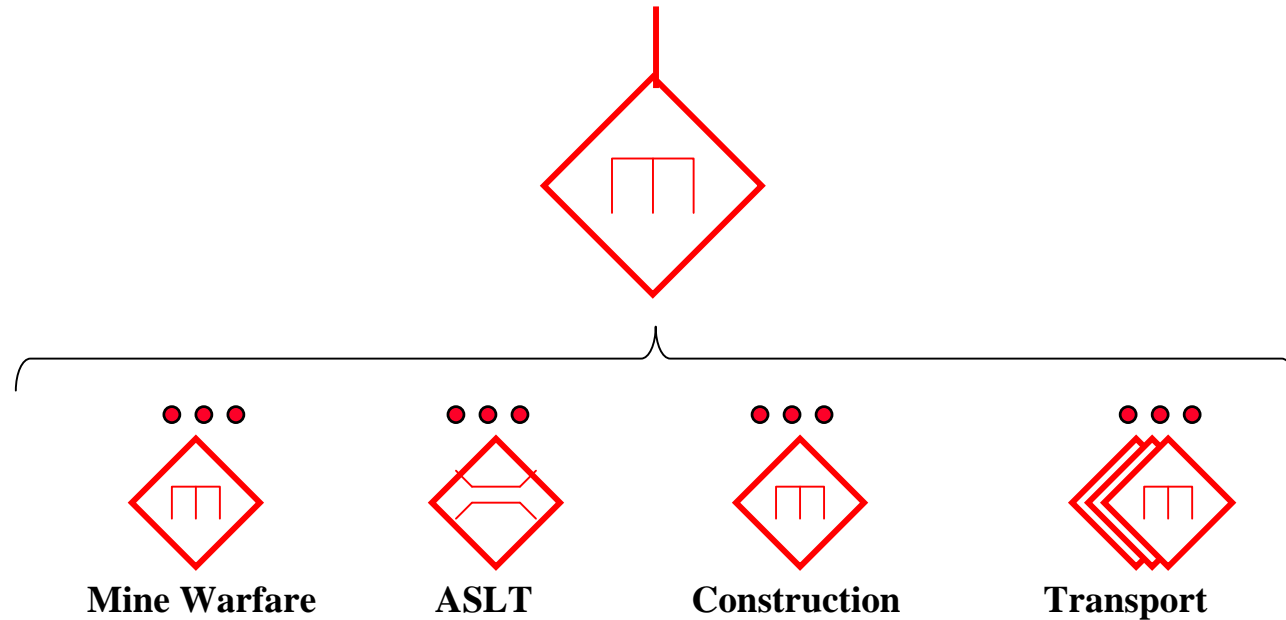
ARMY/CORPS ENGINEER ASSETS



DIVISION ENGINEER ASSETS

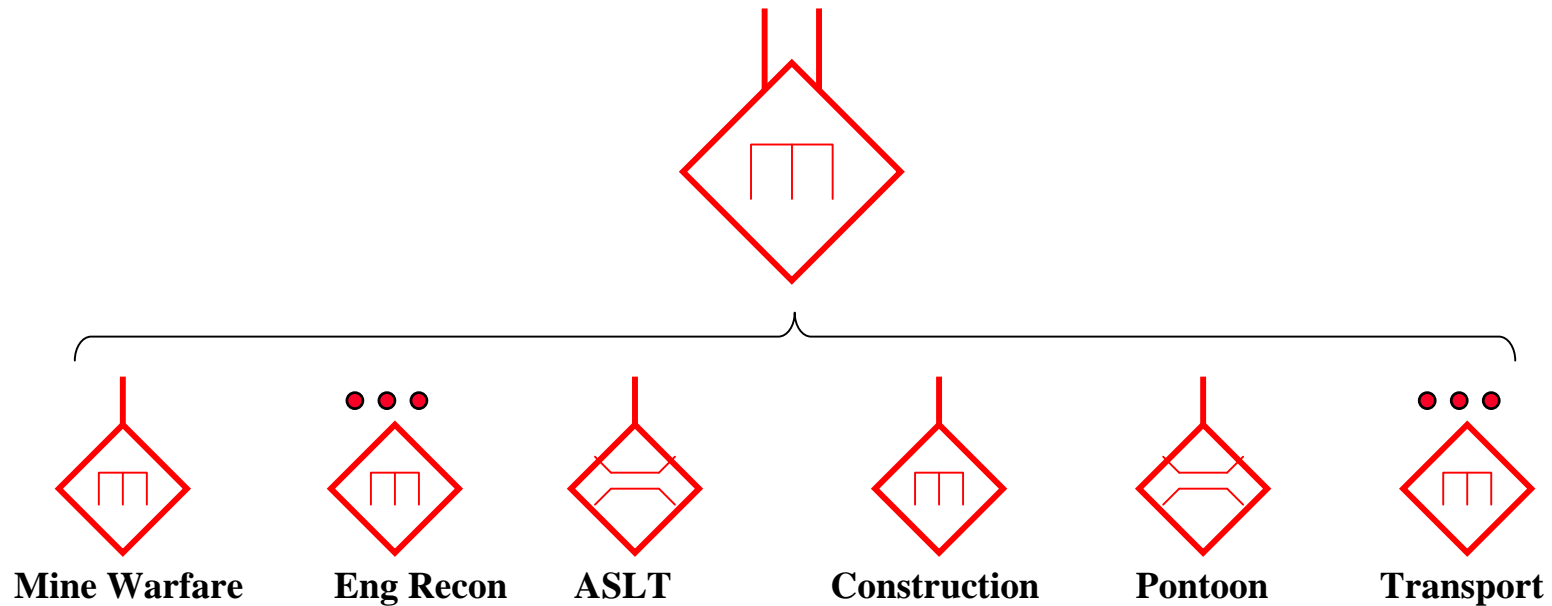


REGIMENTAL ENGINEER ASSETS (DIV)



***Motorized Rifle will have 1 Plt
Tank will have 3**

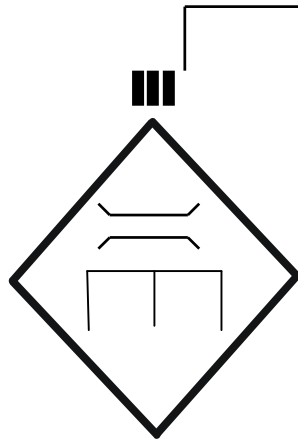
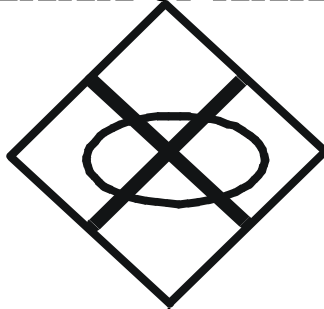
REGIMENTAL ENGINEER ASSETS (INDEPENDENT)



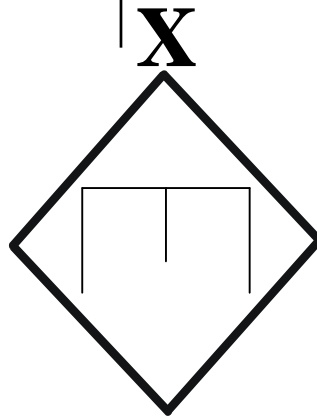
Combat Enemy Engineers

Army/Corps Engineers

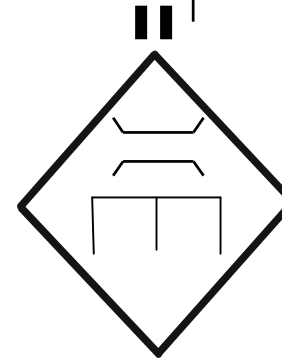
XXXX or XXX



Pontoon



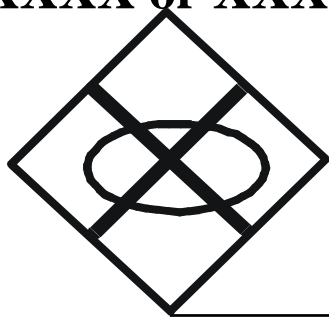
**Combat
Engineer**



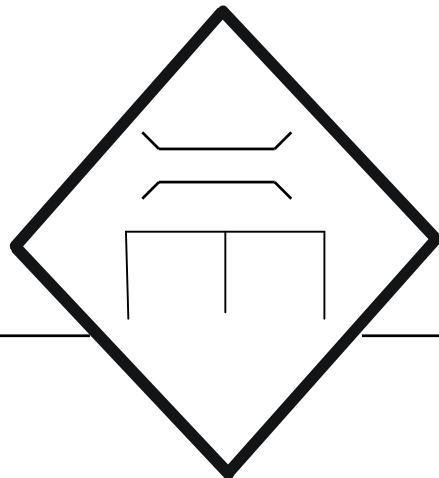
Assault Xing

XXXX¹ or XXX

Combat Enemy Engineers Pontoon Rgt



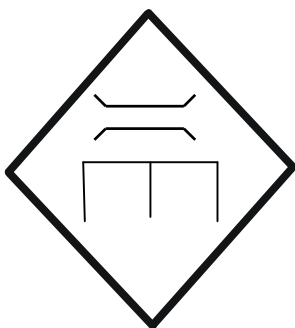
III



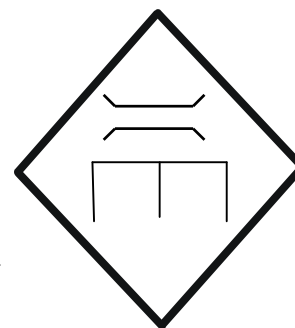
Pontoon Bridge Bn x 3:

- 2x3 - IRM Engineer Recon
- 32x3 - PMP Center section
- 4x3 - PMP ramp section
- 12x3 - Powerboats

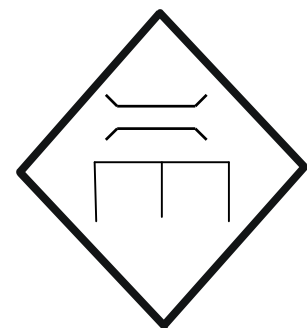
II



II



II



11

XXXX or XXX

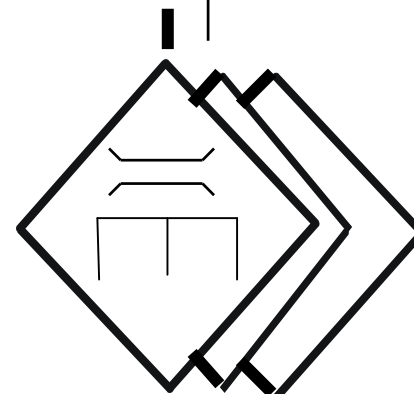
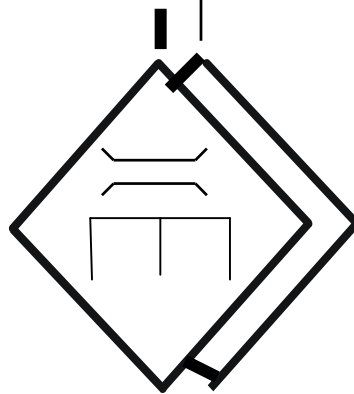
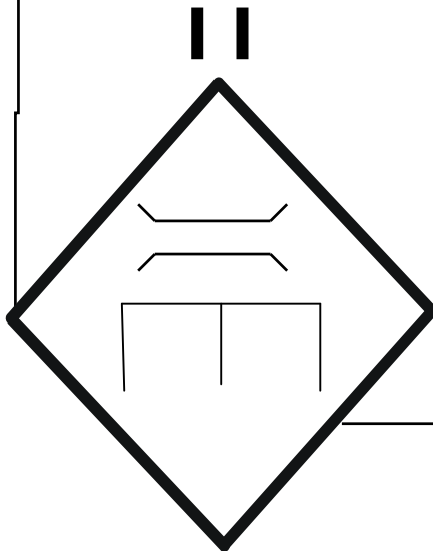
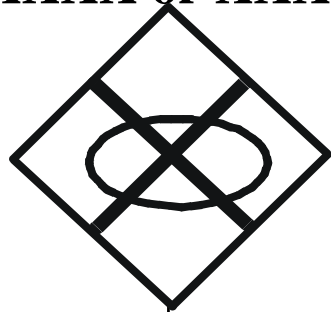
Combat Enemy Engineers Assault Xing Bn

Tracked Amphib Co x2:

- 18x2 - K-61 tracked amphib
- or
- 18x2 - PTS tracked amphib
- 9x2 - PKP amphib trailer

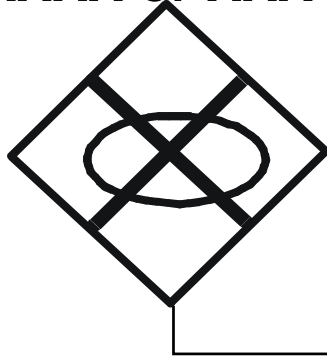
Tracked Ferry Co x3:

- 24x3 - PMM-2 tracked ferry



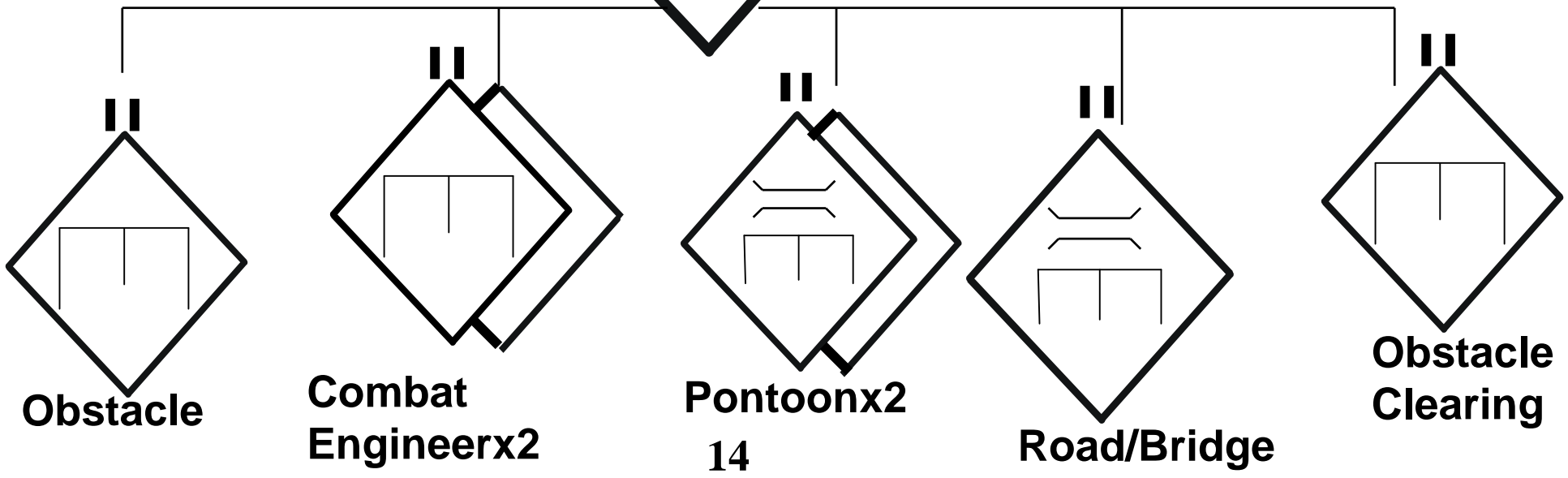
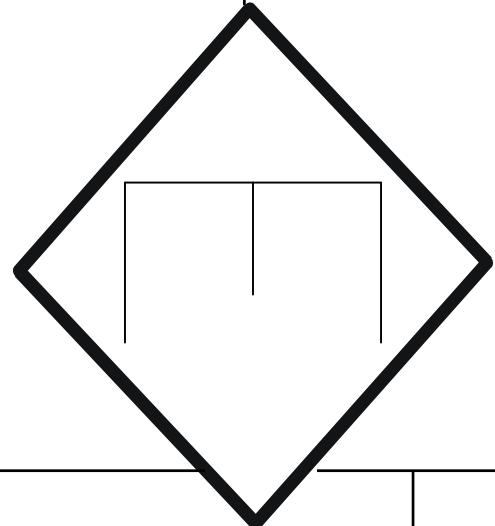
XXXX or XXX

Combat Enemy Engineers Engineer Brigade



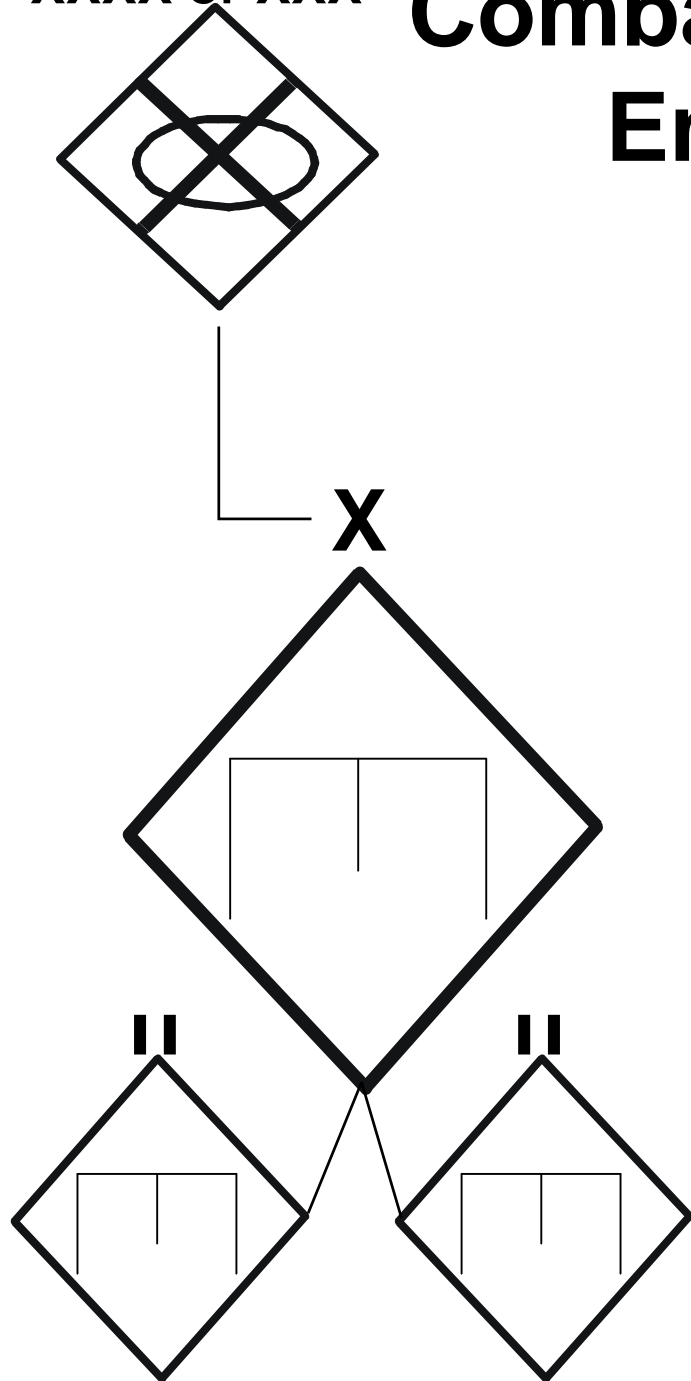
X

- Some BDEs may include:
 - Construction Bn
 - Fabrication Bn
 - Water Supply Bn
 - Camouflage Bn
 - Concealment Bn
 - Deception Bn
 - Railroad Bn



XXXX or XXX

Combat Enemy Engineers Engineer Brigade



Mobility:

- 2x2 - IMR Armored Engineer Tractor
- 8x2 - BAT-M Dozer
- 2x2 - MTK/MTK-2 Mineclearer

Countermobility:

- 3x2 - PMR/GMZ Armored Minelayer
- 3x2* - UMZ Minelayer

Survivability:

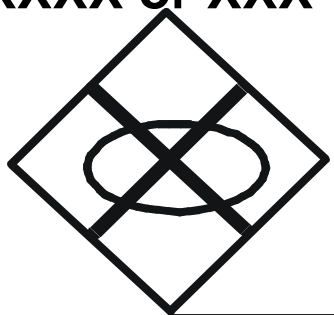
- 3x2 - DIM (Mine Detector)
- 4x2 - MDK (Ditching Machine)

* May or may not be present

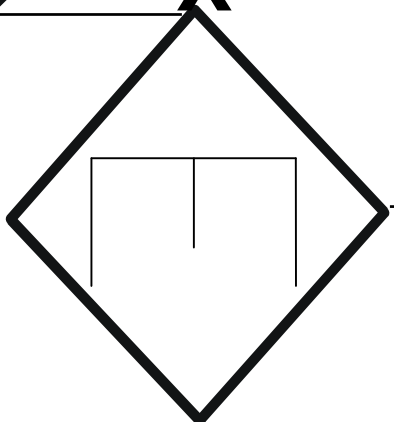
Can form: 6 MSDs
2 MODs

XXXX or XXX

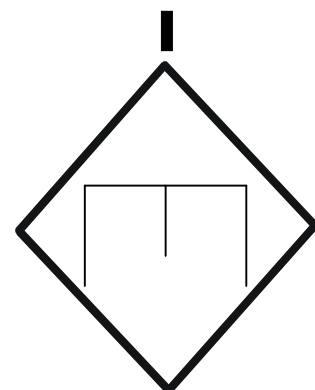
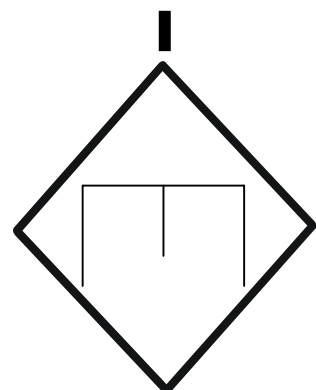
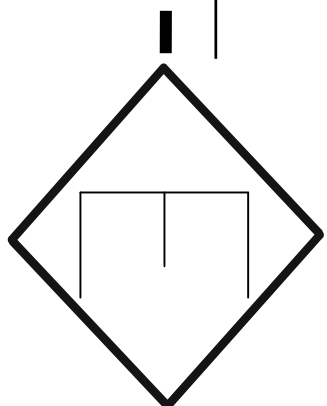
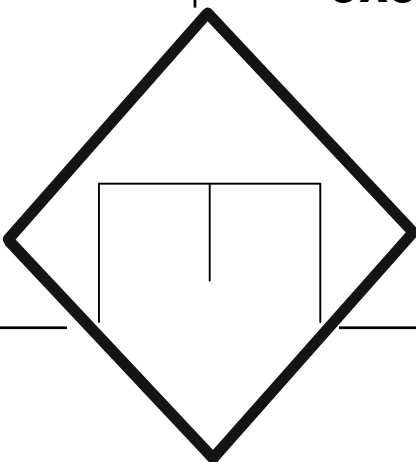
Combat Enemy Engineers Obstacle Bn



X



||



Obstacle Co x3:

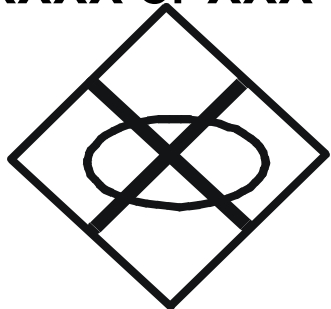
- 3x3 - IRM Engineer Recon
- 9x3 - PMR/GMZ Armored Minelayer
- 3x3 - BTM/MDK (Ditching Machine)

Obstacle Bn Capability

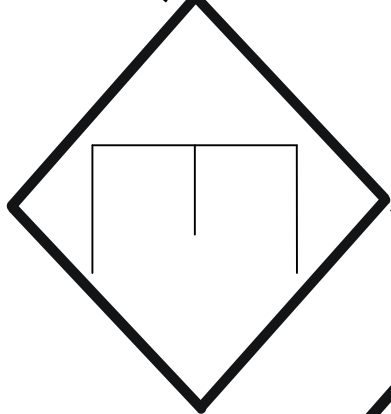
Unit	Capability	Notes
<ul style="list-style-type: none"> • 27 each GMZ/PMR 	<ul style="list-style-type: none"> • Lay 8,100m of standard minefield in 13.5 hrs (surface) or 27 hrs (buried) • One GMZ can lay 1 standard minefield 30 min surface or 1 hr buried • Standard minefield: 300x120m (4 row) 	<ul style="list-style-type: none"> • Obstacle Bn supports the Army/Corps • Surface lay or Bury • IR capable • Basic Load: 208 AT mines
<ul style="list-style-type: none"> • 9 each BTM/MDK 	<ul style="list-style-type: none"> • Primarily used for ditching & berming • Can Dig-108 tank-hull positions in 1 hour • 1 MDK can dig-in 12 tank-hull positions in 1 hour 	<ul style="list-style-type: none"> • The system can dig 1 to 3 meters wide by 1.5 meters deep • Basic Capability: <ul style="list-style-type: none"> - 270 to 570 meters of ditch per hour

XXXX or XXX

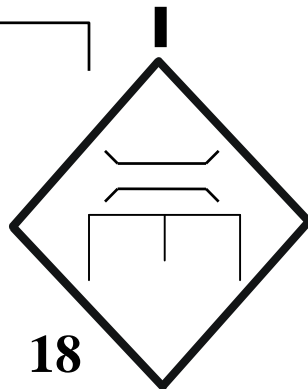
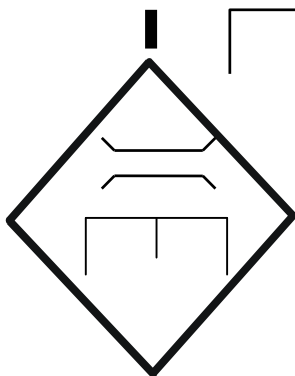
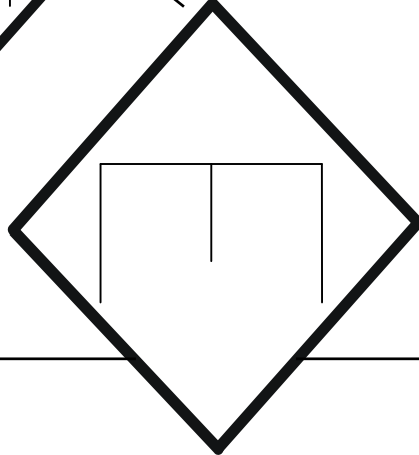
Combat Enemy Engineers Road/Bridge Bn



X



II



18

Truck launch bridge Co x2:

- 8x2 - TMM

Tank launch bridge Co:

- 6x2 - MTU-20

Road const Co:

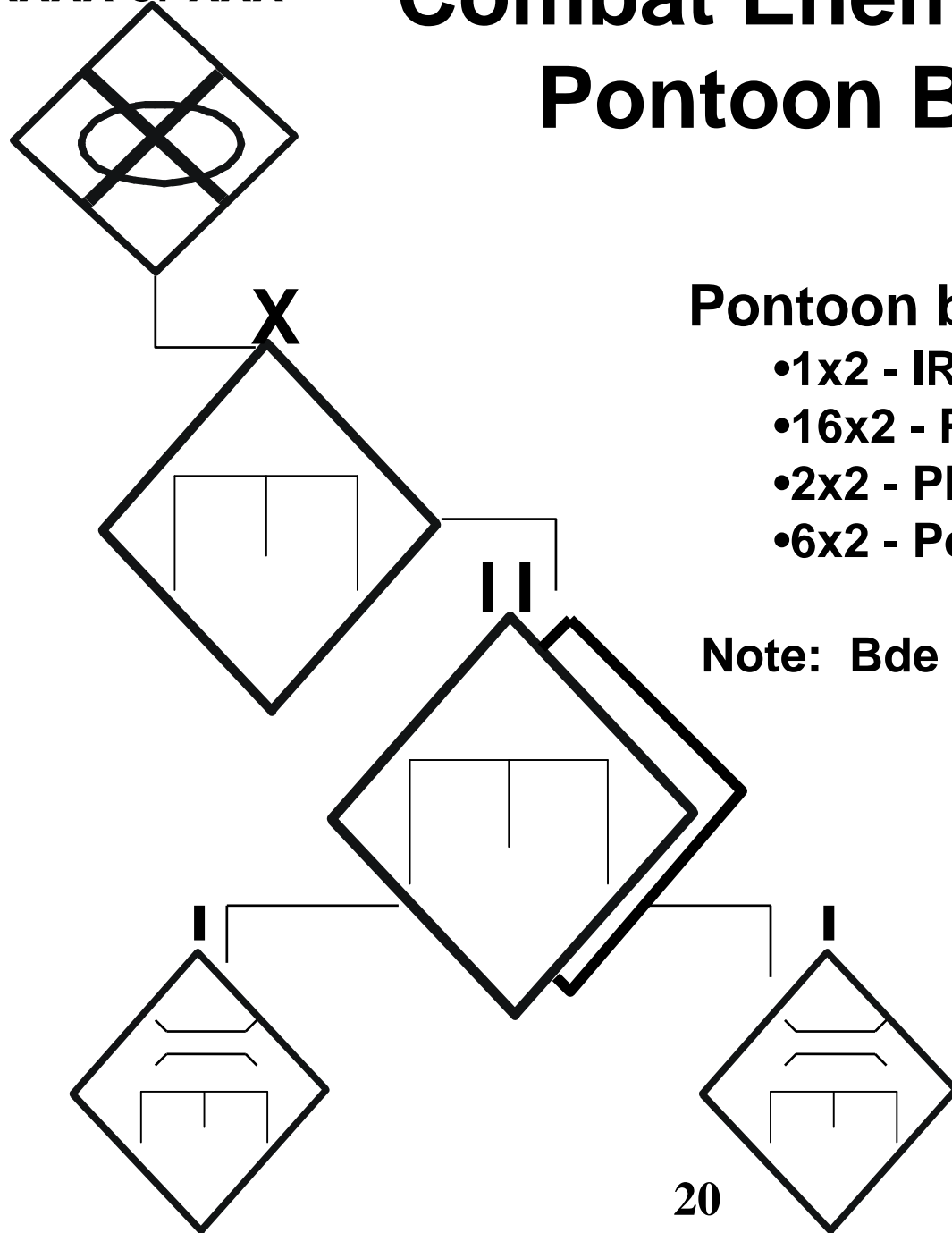
- 3x2 - BAT/PKT
- 2x2 - MDK (Ditching Machine)

Road/Bridge Bn Capabilities

Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 16 TM truck launched 	<ul style="list-style-type: none"> • 1 tank or 2 BTR/BMP can cross one 11.5 span 	<ul style="list-style-type: none"> • Multispan trestle bridge • 4 TMMs = one 42m bridge in 40 to 60 min in day light. Double for night and in water • 1 TMM = 11.5m span
<ul style="list-style-type: none"> • 12 MTU-20 tank launched 	<ul style="list-style-type: none"> • 1 MTU can support 1 tank or 1 BTR/BMP 	<ul style="list-style-type: none"> • 1 MTU = 20m bridge • 5 min to launch

XXXX or XXX

Combat Enemy Engineers Pontoon Bridge Bn



Pontoon bridge Co x2 (each Bn):

- 1x2 - IRM Engineer Recon
- 16x2 - PMP center
- 2x2 - PMP ramp
- 6x2 - Powerboat

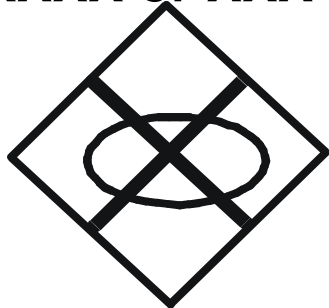
Note: Bde may have 2 Pontoon BNs

Pontoon Bridge Bn Capabilities

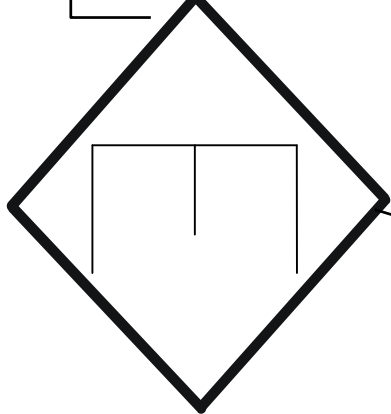
Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 32 PMP bridge center section • 4 PMP bridge ramp section 	<ul style="list-style-type: none"> • Can support 1 tank or 2 BTRs/BMPs at one time 	<ul style="list-style-type: none"> • 398m: 20 ton bridge <i>OR</i> • 227m: 60 ton bridge • En Bde has the full 32/4 set • En Bn has the 16/2 half set (119m for 60 ton or 181m for 20 ton) Building rate: 7m/min
<ul style="list-style-type: none"> • 4 Rafts can be formed from full 32/4 set 	<ul style="list-style-type: none"> • Each raft = 170 ton capacity or 4 tanks 	<ul style="list-style-type: none"> • 1 raft section = 8 center sections and 1 ramp section

XXXX or XXX

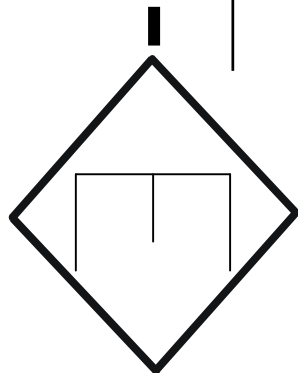
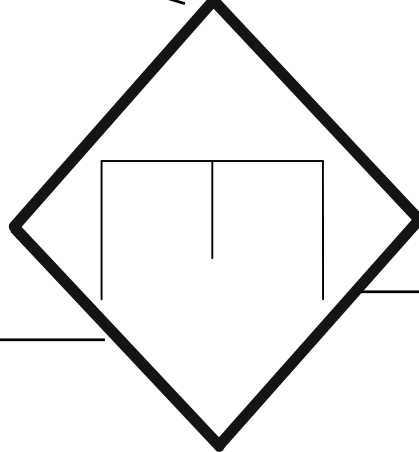
Combat Enemy Engineers Obstacle Clearance Bn



X



II



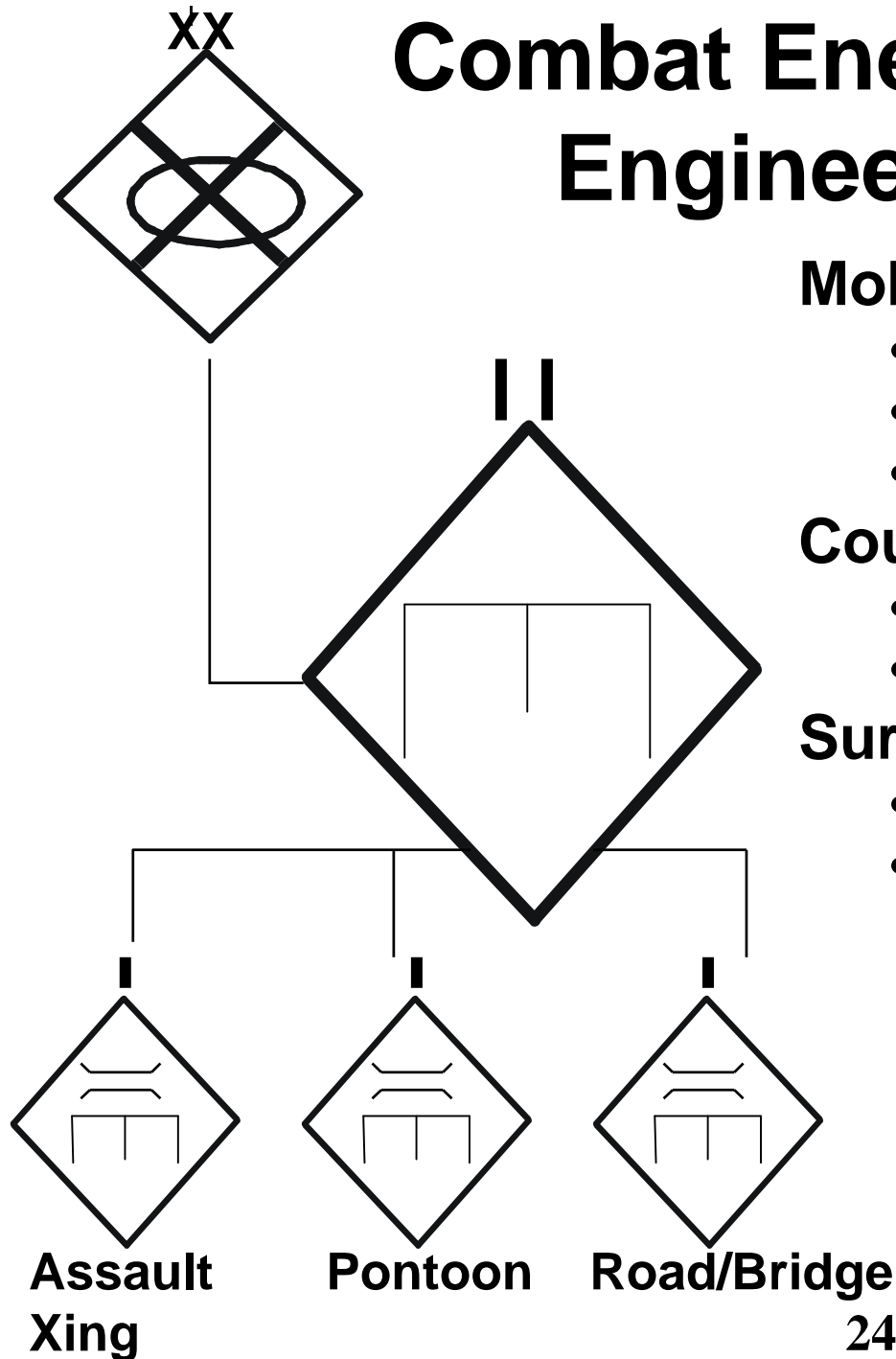
Obstacle clearing Co x3:

- 1x3 - IMR Armored Engineer Tractor
- 1x3 - BAT-M Dozer
- 3x3 - MTK/MTK-2 Mineclearer
- 3x3 - DIM (Mine Detector)

Obstacle Clearance Bn Capability

Unit	Can Clear	Notes
<ul style="list-style-type: none"> • 3 BAT-M 	<ul style="list-style-type: none"> • Moves 750 cubic meters of material/hour OR • 36 hull positions per hour • 1 BAT-M: 200 to 250 cm/hour or 12 hull positions per hour 	<ul style="list-style-type: none"> • Primarily used to clear obstacles (tank ditches, berms, etc) not for survivability
<ul style="list-style-type: none"> • 9 MTKs 	<ul style="list-style-type: none"> • Clears 1530m of minefield 	<ul style="list-style-type: none"> • 1 MTK system clears 170m by 2m (pressure) or 8m (tilt) • UBL:3 rockets
<ul style="list-style-type: none"> • 9 DIMs 	<ul style="list-style-type: none"> • Detects metallic mines at a depth of 25cm 	<ul style="list-style-type: none"> • DIM works at max speed of 10kph while scanning

Combat Enemy Engineers Engineer Battalion



Mobility:

- 2 - IMR Armored Engineer Tractor
- 8 - BAT-M Dozer
- 2 - MTK/MTK-2 Mineclearer

Countermobility:

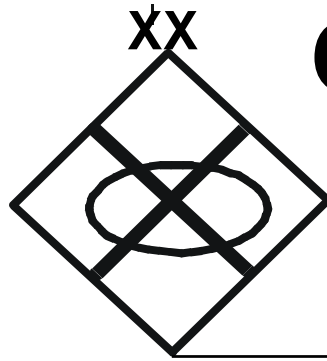
- 3 - PMR/GMZ Armored Minelayer
- 3* - UMZ Minelayer

Survivability:

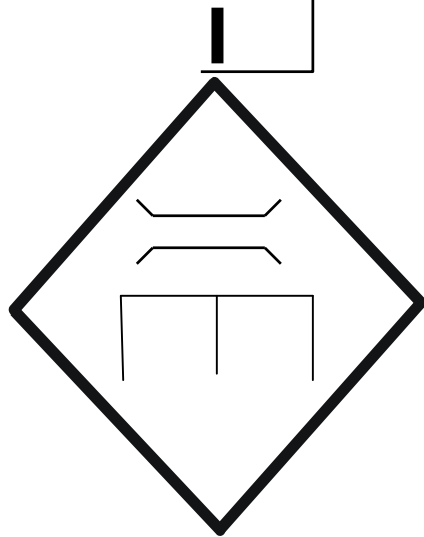
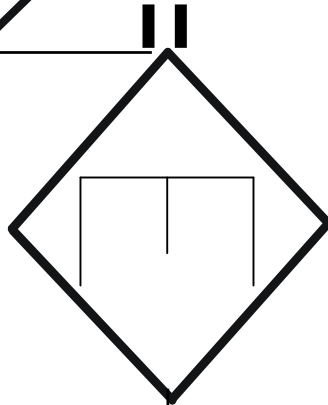
- 3 - DIM (Mine Detector)
- 4 - MDK (Ditching Machine)

* May or may not be present

Can form: 3 MSDs
1 MOD



Combat Enemy Engineer Bn Assault Crossing Company



Amphib Plt x2:

- 6x2 - K-61 tracked amphib
- or
- 6x2 - PTS tracked amphib
- 3x2 - PKP amphib trailer

Ferry Plt:

- 3x2 - GSP tracked ferry
- or
- 4x2 - PMM-2 tracked ferry

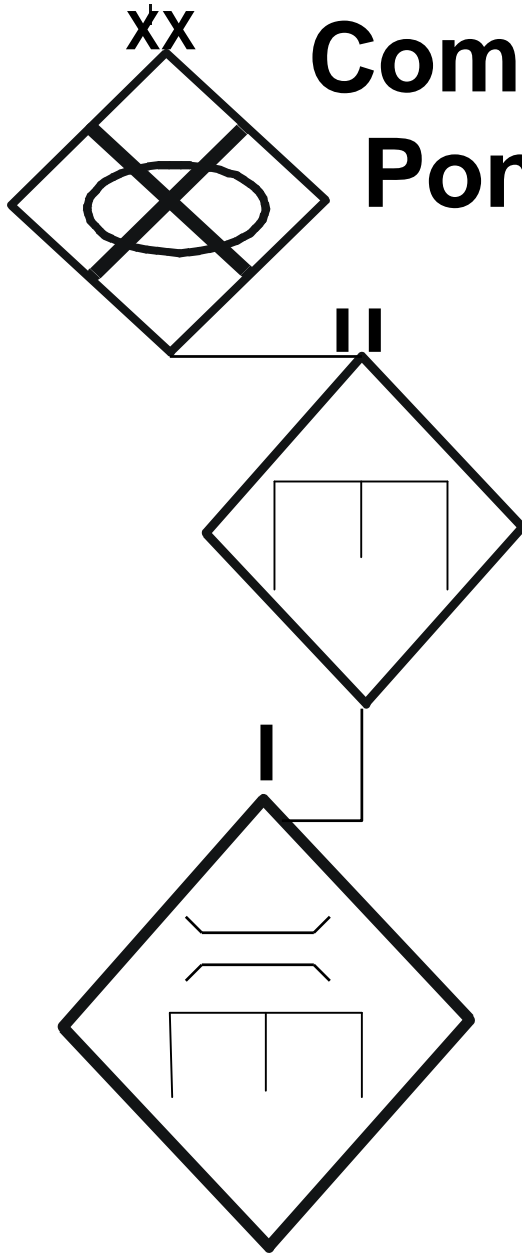
Recon Diving Plt:

- 5x2 - Assault Boat

Assault Crossing Co Capabilities

Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 12 each K-61 tracked amphib 	<ul style="list-style-type: none"> • 600 troops or 1 artillery battery w/ prime movers 	<ul style="list-style-type: none"> • Carries AT, 120mm mortar, 122mm, 152mm & prime movers. 50 soldiers per pay load.
<ul style="list-style-type: none"> • 12 each PTS-M tracked amphib 	<ul style="list-style-type: none"> • 840+ troops or 2 artillery batteries w/ prime movers and crew 	<ul style="list-style-type: none"> • Larger than K-61 • Replaces the K-61 • Is armored • Pulls the PKP trailer
<ul style="list-style-type: none"> • 6 each PKP towed trailer 	<ul style="list-style-type: none"> • Works with PTS-M (see above) 	<ul style="list-style-type: none"> • Artillery transport towed
<ul style="list-style-type: none"> • 6 each GSP Ferry 	<ul style="list-style-type: none"> • 6 tanks or 6 SP howitzers or 8 APC/IFVs 	<ul style="list-style-type: none"> • 3-5 min assembly • Banks no higher than .5 meters
<ul style="list-style-type: none"> • 8 each PMM-2 Ferry 	<ul style="list-style-type: none"> • 8 tanks or 8 SP howitzers or 8 APC/IFVs 	<ul style="list-style-type: none"> • 1 PMM-2 = 1 ferry

Combat Enemy Engineer Bn Pontoon Bridge Company



Pontoon bridge plt x2:

- 8x2 - PMP bridge, center section
- 1x2 - PMP bridge, ramp section

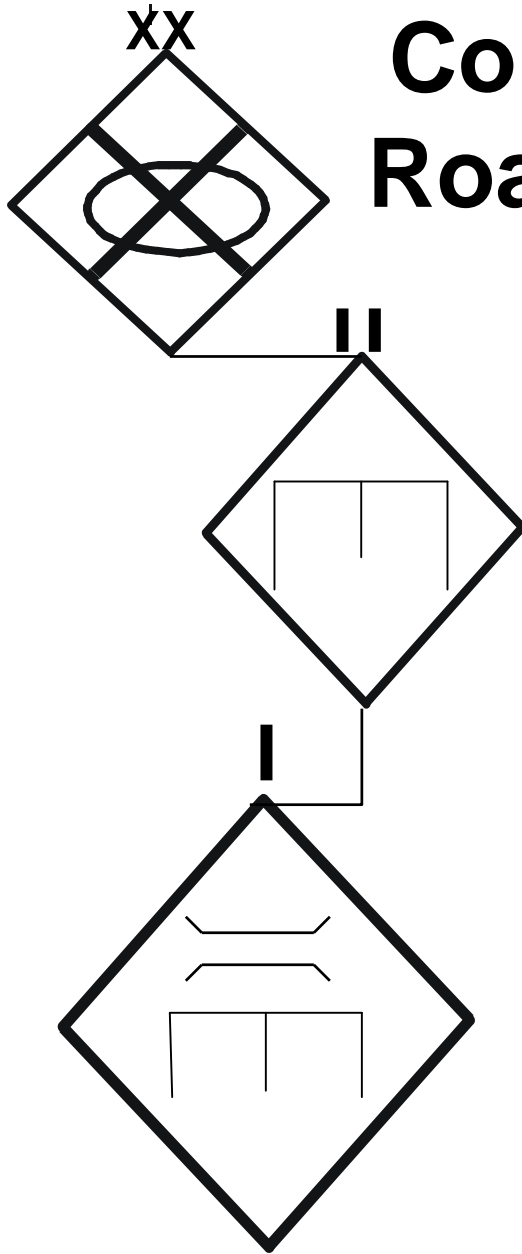
Powerboat plt:

- 3x2 - powerboat

Pontoon Bridge Co Capabilities

Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 16 PMP bridge center section • 2 PMP bridge ramp section 	<ul style="list-style-type: none"> • 60 ton bridge supports 1 tank and 2 BTRs/BMPs at one time • 20 ton bridge supports 2 BTRs/BMPs at one time 	<ul style="list-style-type: none"> • 281m: 20 ton bridge OR • 119m: 60 ton bridge • Engr Bde has the full 32/4 set • Engr Bn has the 16/2 half set
<ul style="list-style-type: none"> • Max 2 Rafts (from their organic half 16/2 set) 	<ul style="list-style-type: none"> • Each raft = 170 ton capacity or 4 tanks 	<ul style="list-style-type: none"> • 1 raft section = 8 center sections and 1 ramp section

Combat Enemy Engineer Bn Road/Bridge Const Company



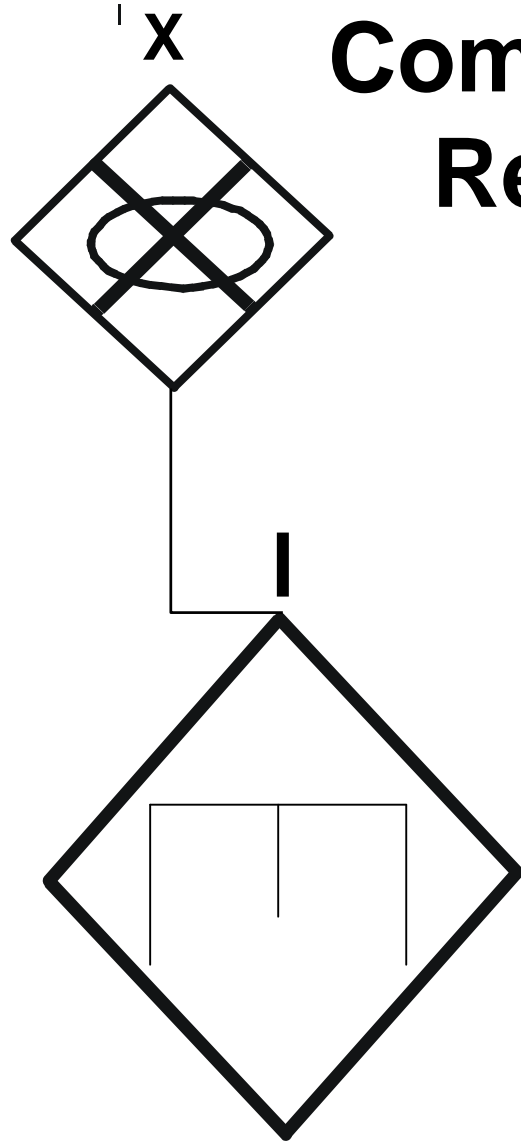
Road/Bridge Const Plt x2:

- 2x2 - MTU-20 tank launched bridge
- 4x2 - TMM truck launched bridge
- 1x2 - BAT/PKT route clearing vehicle

Road/Bridge Co Capabilities

Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 8 TMM truck launched 	<ul style="list-style-type: none"> • 1 tank and 2 BTR/BMP can cross one 11.5 span 	<ul style="list-style-type: none"> • Multispan trestle bridge • 4 TMMs = one 42m bridge in 40 to 60 min in day light. Double for night and in water • 1 TMM = 11.5m span
<ul style="list-style-type: none"> • 4 MTU-20 tank launched 	<ul style="list-style-type: none"> • 1 MTU can support 1 tank and 1 BTR/BMP 	<ul style="list-style-type: none"> • 1 MTU = 20m bridge • Launch time: 5 min

Combat Enemy Engineers Regimental Company



Mobility:

- 1 - IMR Armored Engineer Tractor
- 1 - BAT-M Dozer
- 2 - MTK/MTK-2 Mineclearer
- 9/27* - KMT-6M (Mine Clearing Plow)
- 3/9* - KMT-5M (Mine Roller)

Countermobility:

- 3 - PMR/GMZ Armored Minelayer

Survivability:

- 1 - DIM (Mine Detector)
- 1 - MDK (Ditching Machine)
- 3 - PZM (Ditching Machine)

* Infantry/Tank

Can form: 1MSD
1MOD

Offense

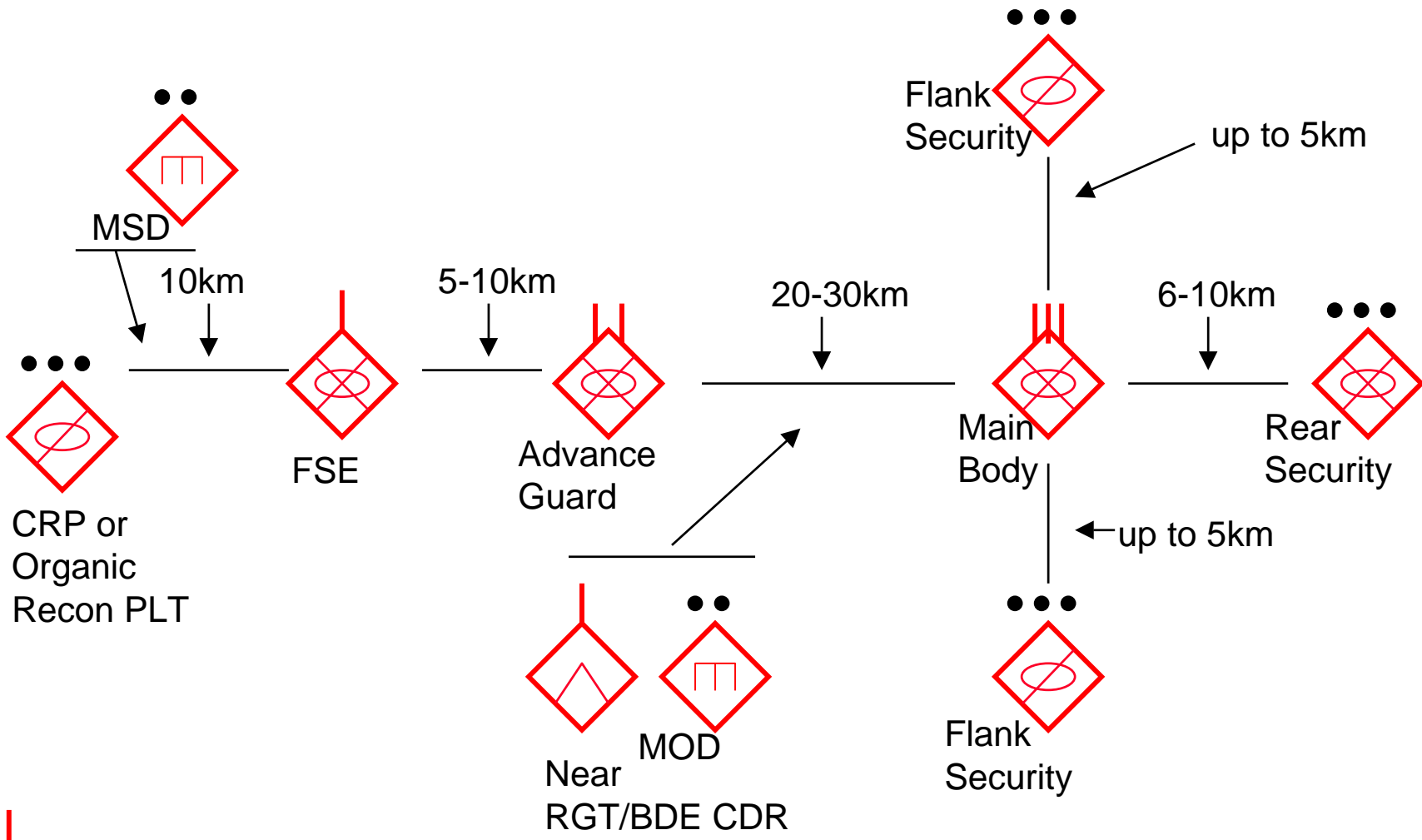


The March in the Offense

- Movement Support Detachments (MSD) perform:
 - Route recon
 - Mineclearing
 - Route marking
 - Clearing obstacles
 - Road/Bridge repair
- Mobile Obstacle Detachment (MOD) protect the flanks:
 - Usually operate AT reserve established by DIV or Regimental Cdr
 - REG MODs usually between Adv Guard and Main Body, near the Reg Cdr
- The Regiment's Engineer CO is broken up to support the entire formation

OFFENSE

The March Formation



★ Engineer Co is broken up to support entire formation

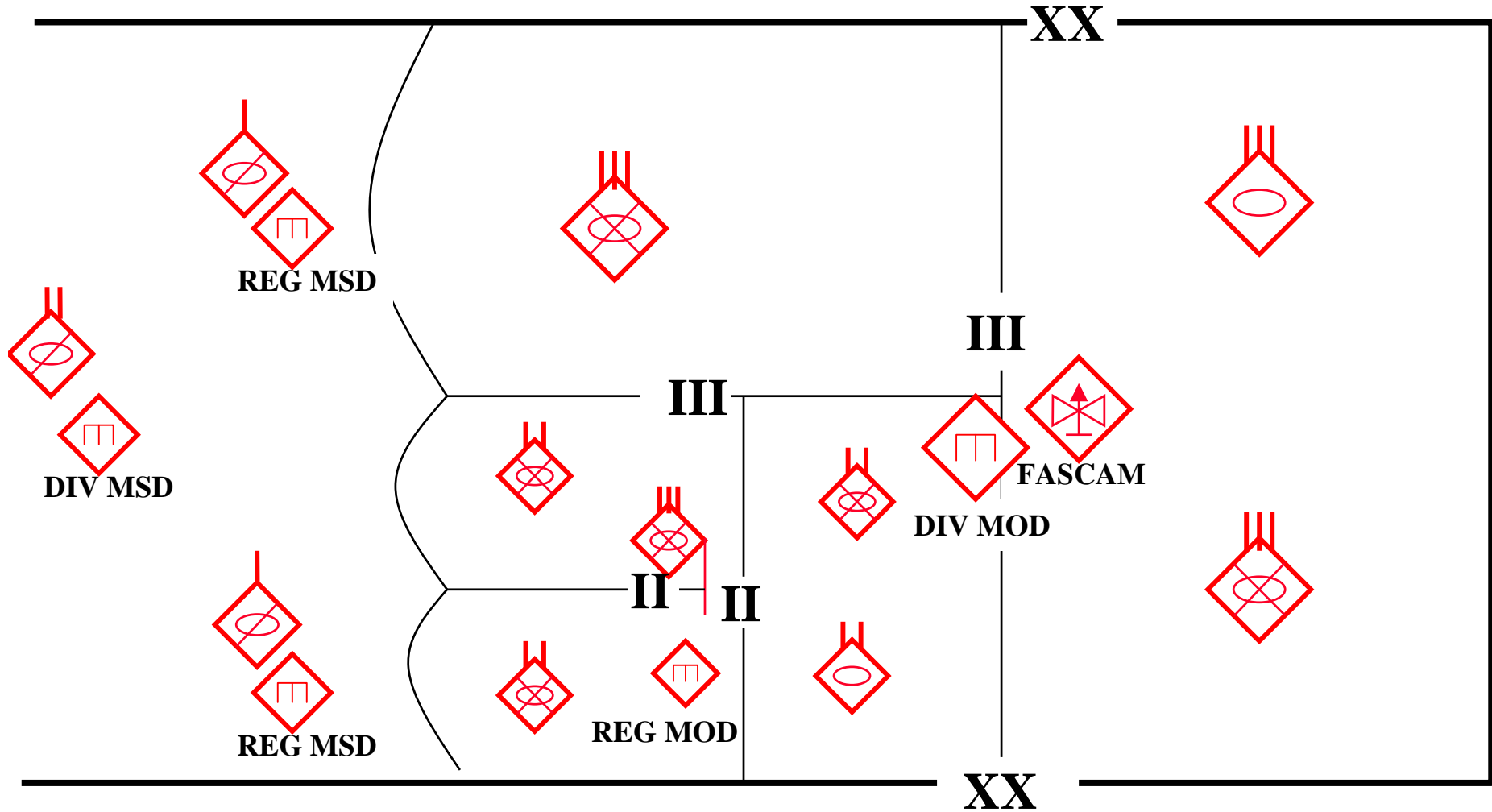
Attack vs Strong Defense

- Characterized by 2 Regiments in the first echelon and 2 in the second
- MSDs probe line and clear routes
- Divisional MOD found between the 1st and second Echelon
 - May be supported by rotary wing FASCAM

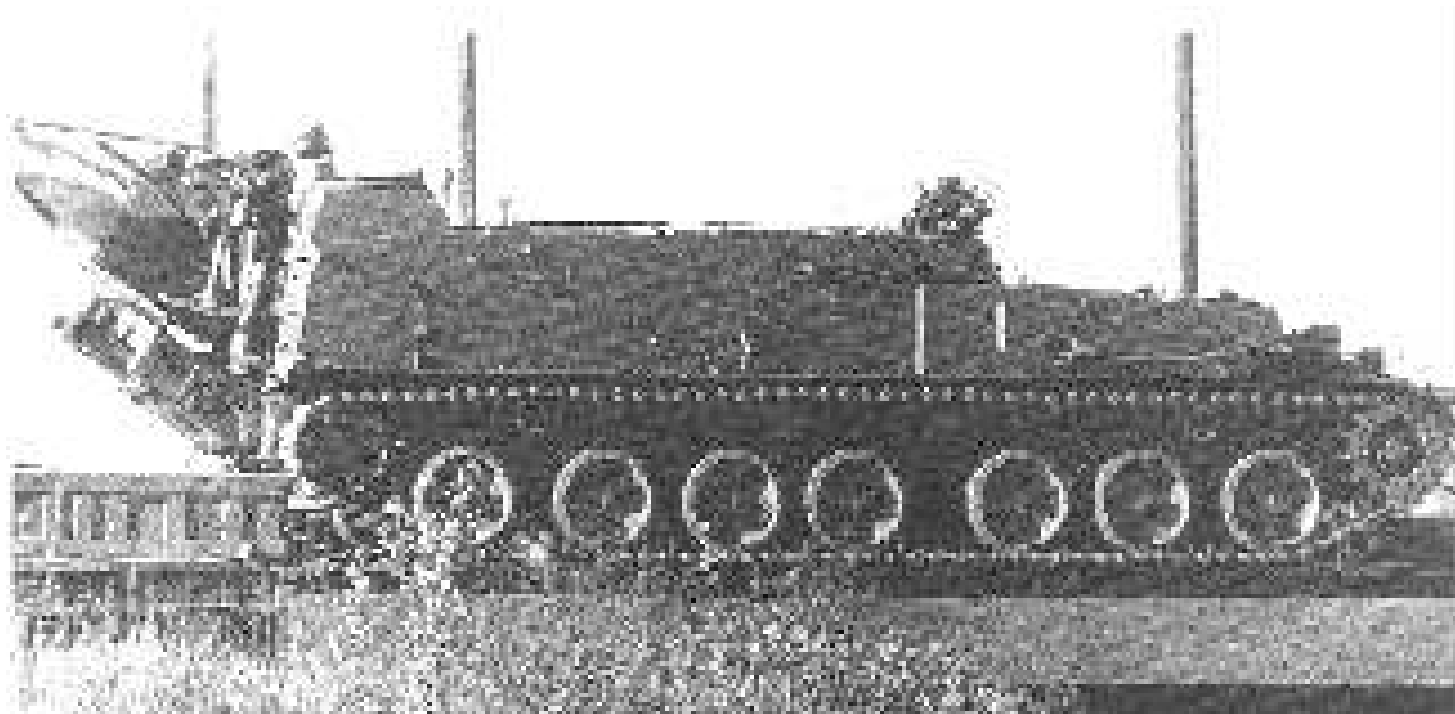
OFFENSE

VS Strong Defense

100km



Defense



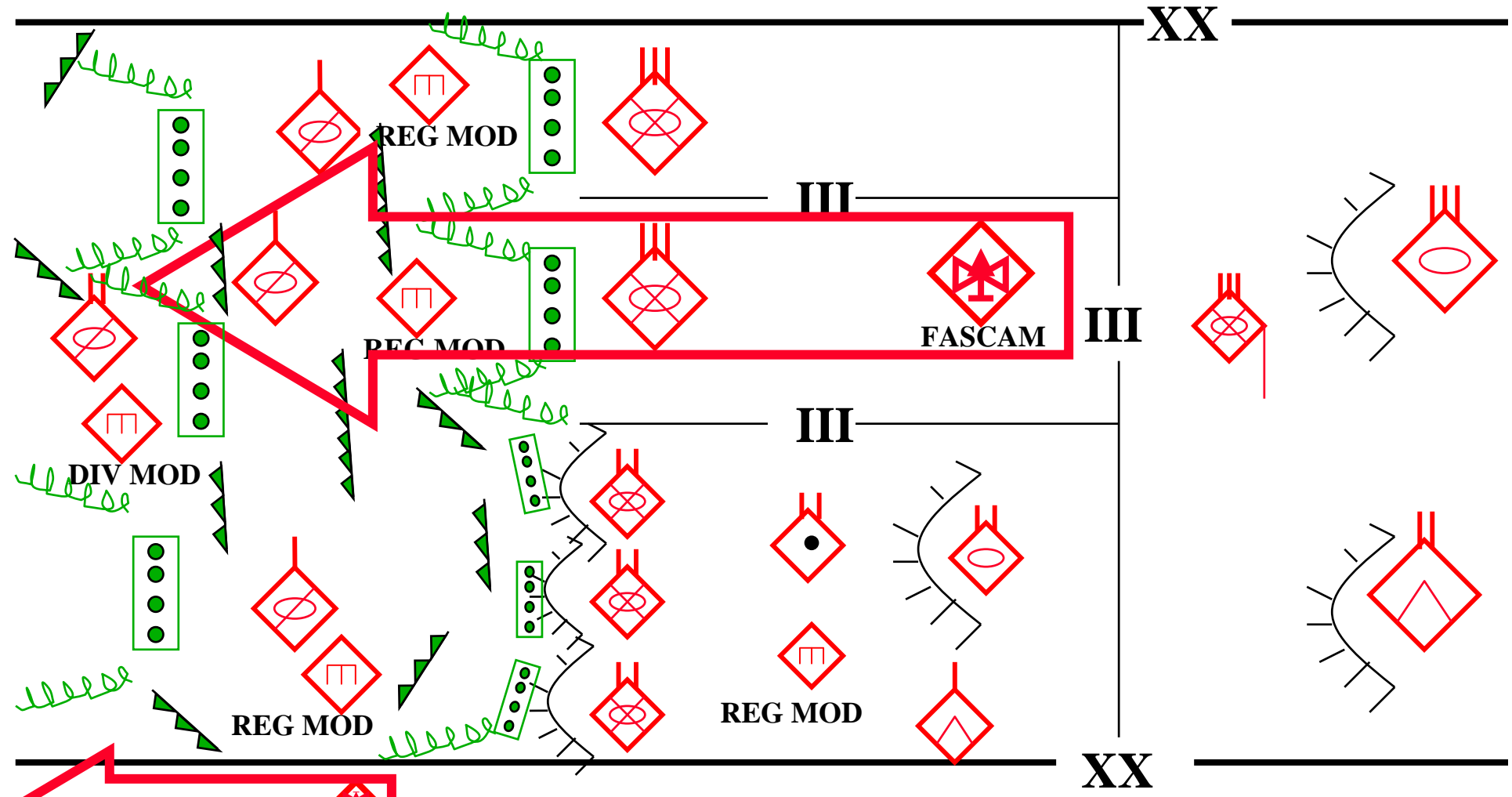
Defense

- Majority of obstacles located within the 50km security zone.
 - Obstacles are covered by direct fire
- MODs:
 - prepare obstacles and fighting positions
- OPFOR uses FASCAM to reseed a compromised minefield, stop an advancing force or breakup a positioned force

Security Zone
50km

DEFENSE

MRD in the Defense



—line of attack for Helo FASCAM 15-20km Main Defensive Belt

Mine Warfare



OPFOR Mines

Equipment Initiation Blast hardened Anti-handling Metallic Emplacement

•TM-62	Pressure fuze	NO	Internal	Varies	Manual/GMZ/PMR
	Influence	Yes	Internal		Manual/GMZ/PMR
	Tilt rod	Yes	N/A		Manual
•TM-57	Pressure fuze	NO	External	High	Manual/GMZ/PMR
	Tilt rod	Yes	External		Manual
•TM-46	Pressure fuze	NO	External	High	Manual/GMZ/PMR
	Tilt rod	Yes	External		Manual
• TMD-B	Pressure fuze	NO	Externall	Low	Manual

OPFOR Mines (Scatterable)

Equipment Initiation Blast hardened Anti-handling Metallic Emplacement

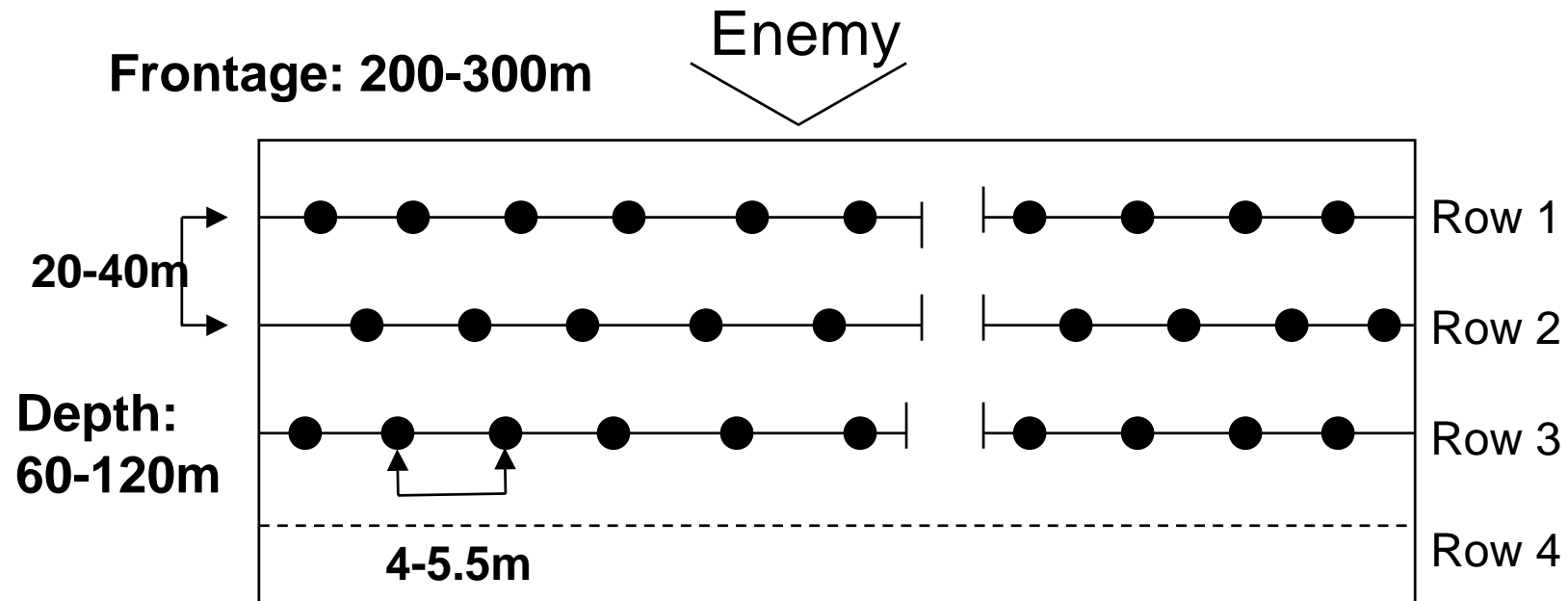
•PTM-3 AT	Magnetic	UNK	Yes	UNK	UMZ/VSM1 helo system/ PKM manpack
•PTM-1S AT	Pressure fuze	UNK	UNK	UNK	UMZ/VSM1 helo system/ PKM manpack
•POM-1S •POM-2S AP	Electro- mechanical w/ tilt mechanism	UNK	UNK	UNK	Scatterable mine containers: 64 PFM-1S 8 POM-1S 4 POM-2 3 PTM-1S 1 PTM-3
• PFM-1S AP	Pressure fuze	UNK	UNK	Low	

Mine Emplacing Capability

Equipment	Can Emplace	Time
•1 GMZ	<ul style="list-style-type: none"> • 300m x 120m 4 row minefield •156 mines/row 	<ul style="list-style-type: none"> •30 min surface •60 min buried
•1 UMZ	<ul style="list-style-type: none"> • 1,100m x 120m 4 row minefield • 2880 mines/row 	<ul style="list-style-type: none"> • 1 hr • Reload Time 2 hrs
•1 PMR-3 towed	<ul style="list-style-type: none"> • 300m x 120m 4 row minefield • 52 mines/row 	<ul style="list-style-type: none"> • 5-10 min per minefield
• PKM Platoon Hand Emplaced	<ul style="list-style-type: none"> • 300m x 90m (surface) 	<ul style="list-style-type: none"> • 90 min per minefield

MINEFIELDS

Standard AT Minefield



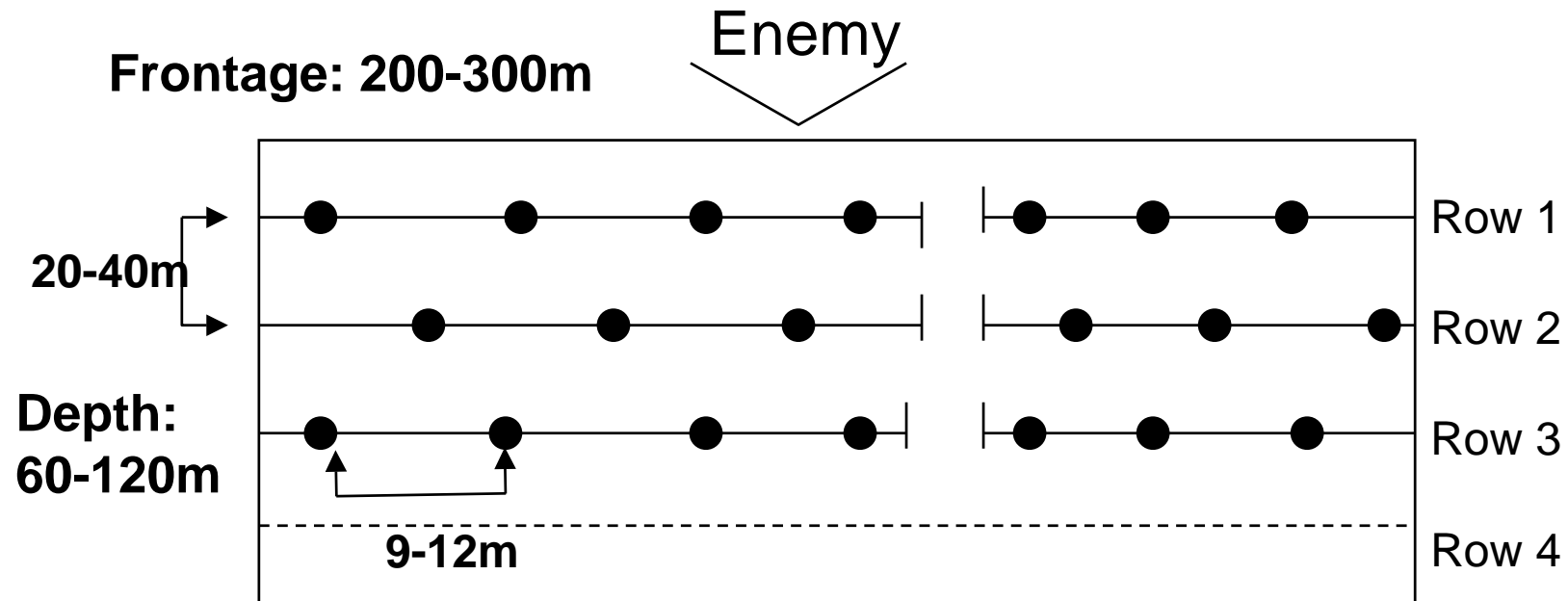
**Pressure activated mines
4 to 5.5m spacing**

Minefields

- Pressure activated
 - Normal outlay for 1 km or frontage:
 - 550-750 pressure activated mines
 - Up to 1000 AT mines or more per km of frontage on major AA's
 - Urban- groups placed on narrow streets and alleys
 - Emplacement rate: 1 mine/100m
 - **Minefields may be blast, fragmentation or mixed**
 - Mixed minefields never mix AT and AP within a row
 - AT mine requirements determine the minefield's parameters, outlay and density

MINEFIELDS

Standard AT Minefield

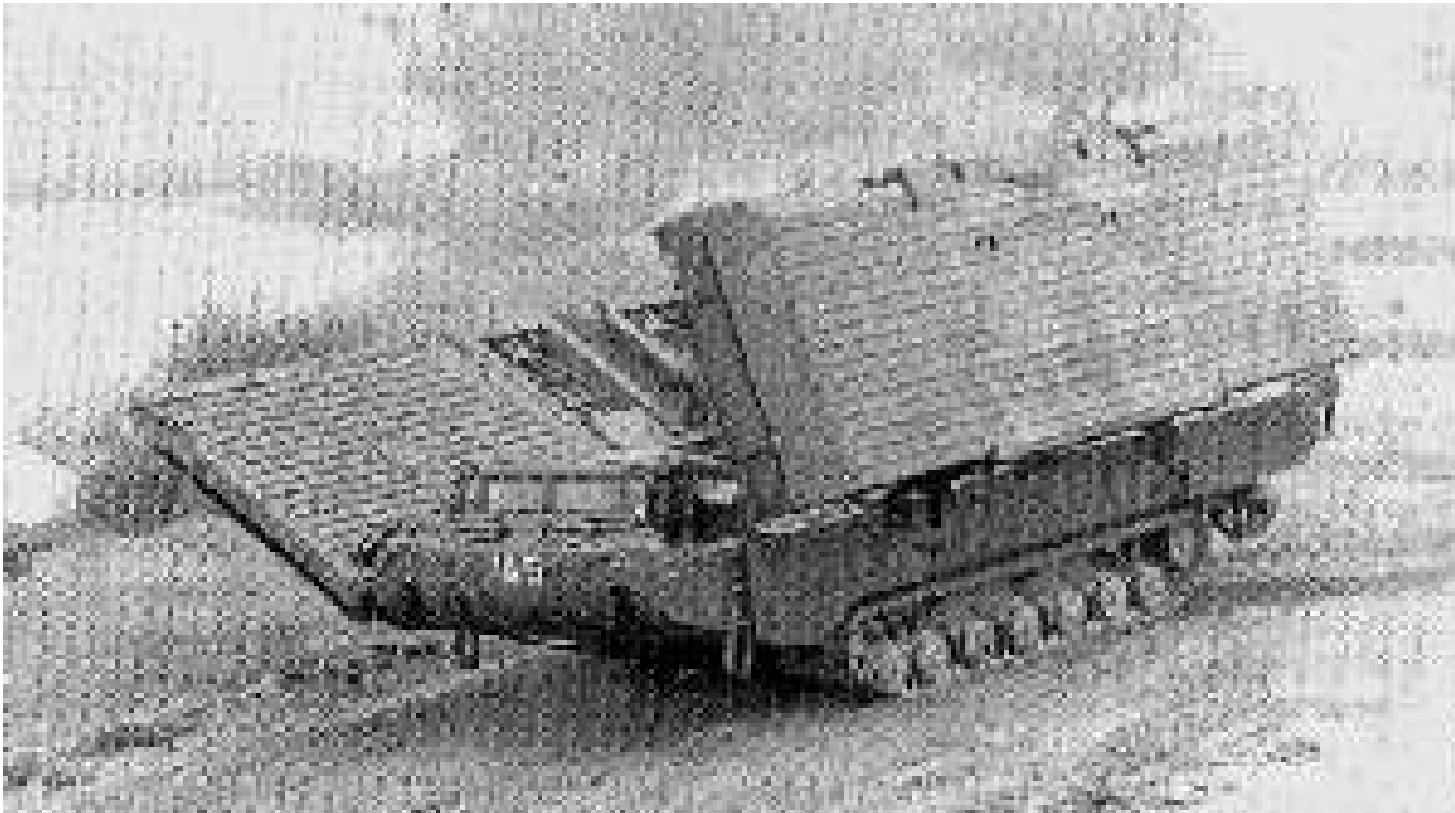


**Full-Width attack mines
9 to 12m spacing**

Minefields

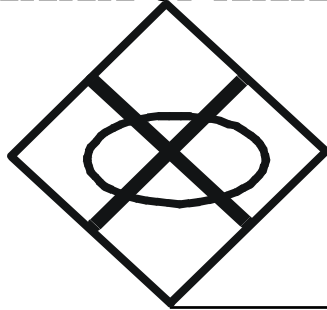
- Full-width attack
 - Usually will be shaped charge mines
 - Fuses: tilt-rod/magnetic/seismic/acoustic/tripwire
 - Normal outlay for 1 km or frontage:
 - 300-400 full-width attack mines
 - Up to 1000 AT mines or more per km of frontage on major AA's
 - Urban- groups placed on narrow streets and alleys
 - Emplacement rate: 1 mine/100m
 - Minefields coverage
 - Direct and indirect fires
 - AT weapons

Bridging

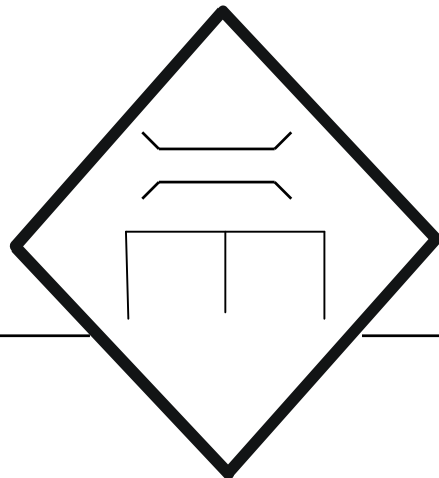


XXXX¹ or XXX

Combat Enemy Engineers Pontoon Rgt



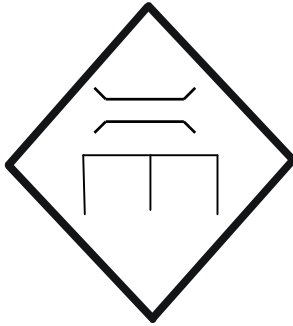
III



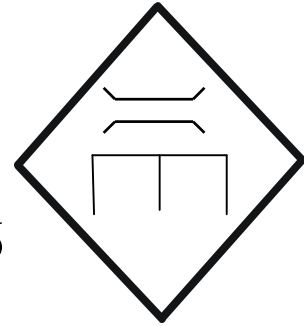
Pontoon Bridge Bn x 3:

- 2x3 - IRM Engineer Recon
- 32x3 - PMP Center section
- 4x3 - PMP ramp section
- 12x3 - Powerboats

II

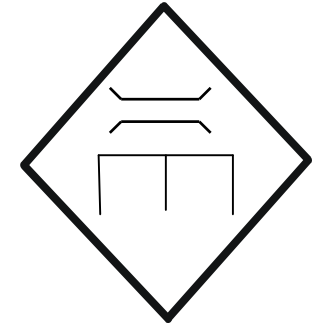


II

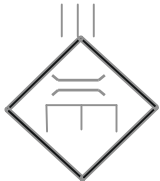


56

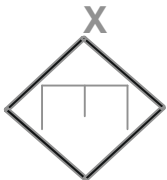
II



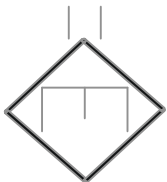
Army Pontoon Bridging Capabilities



Pontoon Regiment has 3 Pontoon BNs. Each Bn having 2 Pontoon Companies
Total of 6 Pontoon companies each capable of emplacing ONE 119 meter class 60 bridge



Engineer Brigade has 2 Pontoon BNs. Each Bn having 2 Pontoon Companies.
Engineer Brigade has 2 Sapper BNs. Each Bn having 1 Pontoon Company
Total of 5 Pontoon companies each capable of emplacing ONE 119 meter class 60 bridge



Sapper Engineer Battalion organic to each Division has 1 Pontoon company.
The company is capable of emplacing ONE 119 meter class 60 bridge

Basic configurations

Number of Companies	MLC 60 Bridge Capability
2	1 X 238 meters
4	1 X 478 meters
14	7 X 227 meters
15	5 X 335 meters

Pontoon Bridge Rgt Capabilities

Equipment	Capability	Notes
<ul style="list-style-type: none"> • 96 PMP bridge center section • 12 PMP bridge ramp section 	<ul style="list-style-type: none"> • Can support 1 tank or 2 BTRs/BMPs at one time 	<ul style="list-style-type: none"> • 3 x 398m bridge @ 20 ton capacity <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • 3x 227m bridge @ 60 ton capacity
<ul style="list-style-type: none"> • Max 12 Rafts for the Regiment 	<ul style="list-style-type: none"> • 12 rafts clear 48 tanks or approximately 2 Bns • Each raft = 170 ton capacity or 4 tanks 	<ul style="list-style-type: none"> • 1 raft section: 8 center sections & 1 ramp

Pontoon Bridging Doctrine

- Any site over 150 meters is an Army Mission
- Crosses Divisions with 2 Regiments ABREST
- 2 Crossing sites for each Regiment.
- 4 crossing sites for each Division
- A Division generally has approximately 28,000 vehicles
- The march rate is 200 vehicles per hour over a bridge
- 36 hours to cross a Division and 1 day to build all sites unopposed
- Uses Assault crossing ferry assets to get initial combat power across (generally artillery and tanks)
- Conduct simultaneous operations rafting and bridging

XXXX or XXX

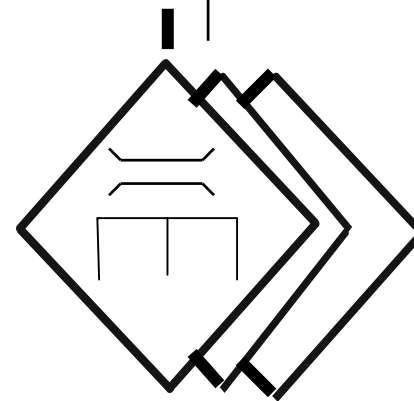
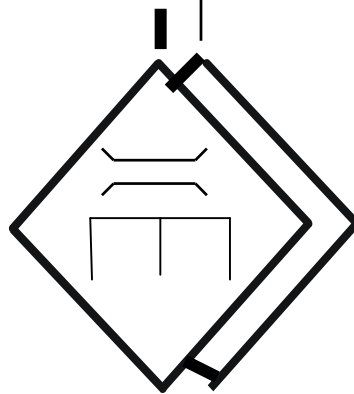
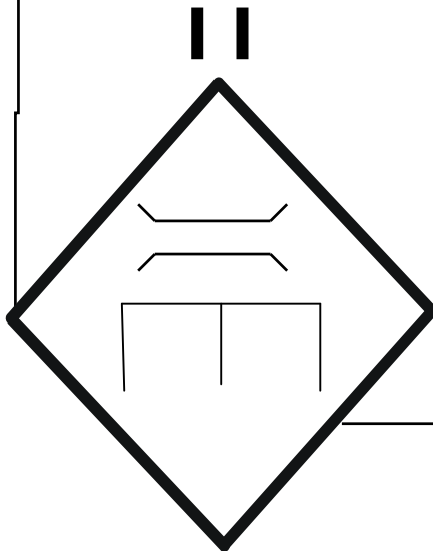
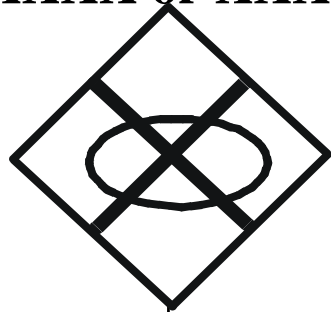
Combat Enemy Engineers Assault Xing Bn

Tracked Amphib Co x2:

- 18x2 - K-61 tracked amphib
- or
- 18x2 - PTS tracked amphib
- 9x2 - PKP amphib trailer

Tracked Ferry Co x3:

- 24x3 - PMM-2 tracked ferry

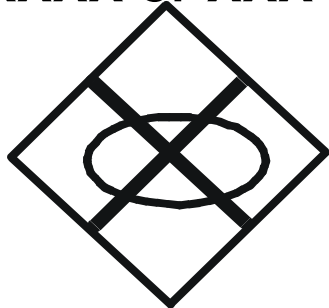


Assault Xing Bn Capabilities

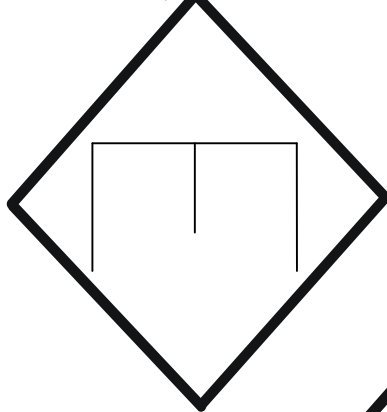
Equipment	Capabilities	Notes
<ul style="list-style-type: none"> • 18 each K-61 tracked amphib 	<ul style="list-style-type: none"> • 900 troops or 1.5 artillery batteries w/ prime movers 	<ul style="list-style-type: none"> • Carries AT, 120mm mortar, 122mm, 152mm & prime movers. 50 soldiers per pay load.
<ul style="list-style-type: none"> • 18 each PTS-M tracked amphib 	<ul style="list-style-type: none"> • 1200 troops or 2 artillery batteries w/ prime movers and crew 	<ul style="list-style-type: none"> • Larger than K-61 • Replaces the K-61 • Is armored • Pulls the PKP trailer
<ul style="list-style-type: none"> • 9 each PKP towed trailer 	<ul style="list-style-type: none"> • Works with PTS-M 	<ul style="list-style-type: none"> • Primarily used to transport towed artillery pieces
<ul style="list-style-type: none"> • 24 each PMM-2 Ferry 	<ul style="list-style-type: none"> • 24 tanks or 24 SP howitzers or 24 APC/IFVs 	<ul style="list-style-type: none"> • 1 PMM-2 = 1 ferry

XXXX or XXX

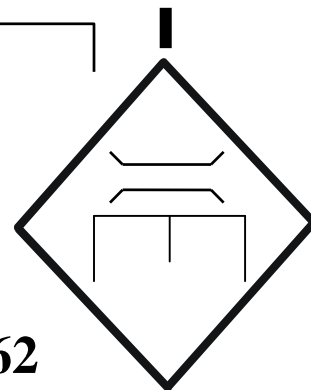
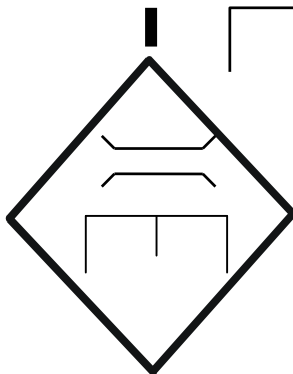
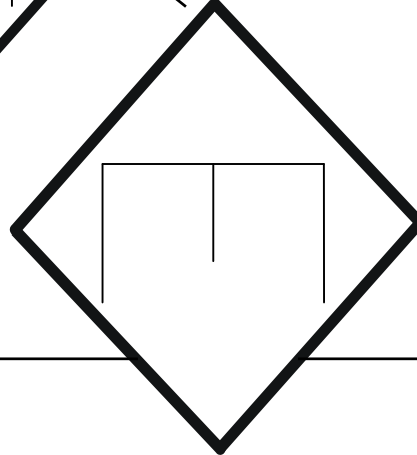
Combat Enemy Engineers Road/Bridge Bn



X



II



62

Truck launch bridge Co x2:

- 8x2 - TMM

Tank launch bridge Co:

- 6x2 - MTU-20

Road const Co:

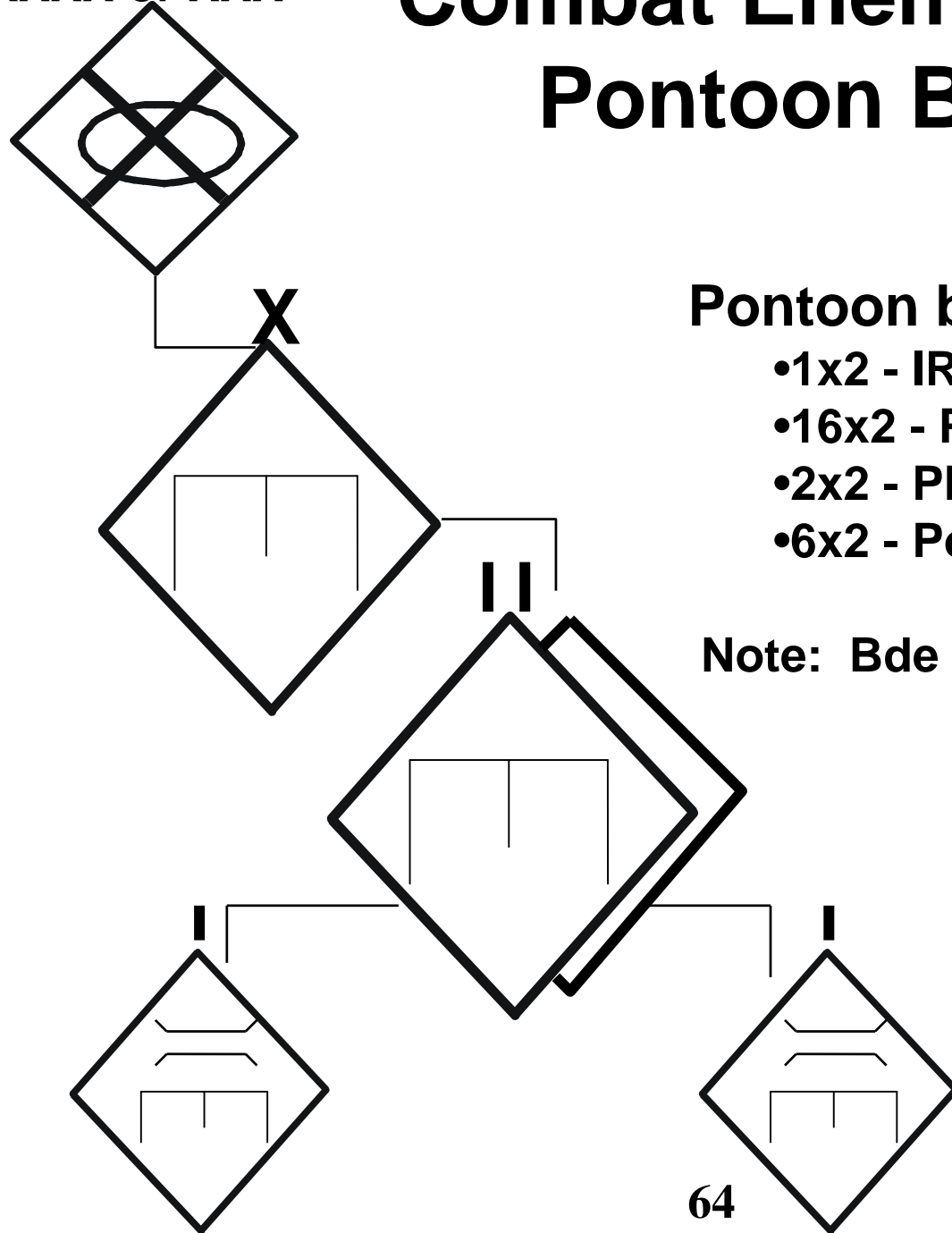
- 3x2 - BAT/PKT
- 2x2 - MDK (Ditching Machine)

Road/Bridge Bn Capabilities

Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 16 TM truck launched 	<ul style="list-style-type: none"> • 1 tank or 2 BTR/BMP can cross one 11.5 span 	<ul style="list-style-type: none"> • Multispan trestle bridge • 4 TMMs = one 42m bridge in 40 to 60 min in day light. Double for night and in water • 1 TMM = 11.5m span
<ul style="list-style-type: none"> • 12 MTU-20 tank launched 	<ul style="list-style-type: none"> • 1 MTU can support 1 tank or 1 BTR/BMP 	<ul style="list-style-type: none"> • 1 MTU = 20m bridge • 5 min to launch

XXXX or XXX

Combat Enemy Engineers Pontoon Bridge Bn



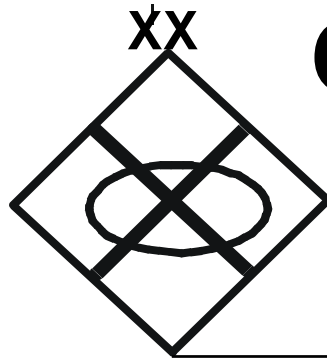
Pontoon bridge Co x2 (each Bn):

- 1x2 - IRM Engineer Recon
- 16x2 - PMP center
- 2x2 - PMP ramp
- 6x2 - Powerboat

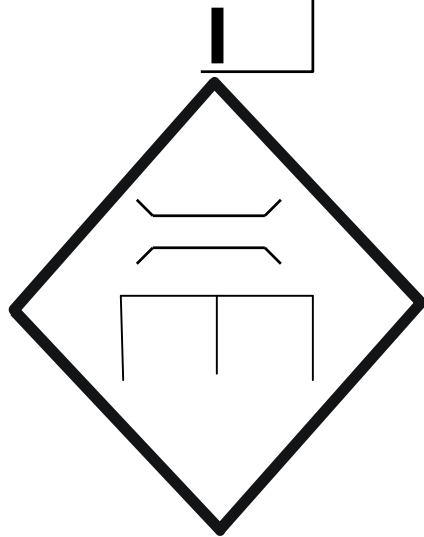
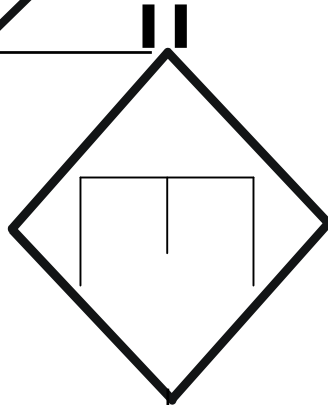
Note: Bde may have 2 Pontoon BNs

Pontoon Bridge Bn Capabilities

Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 32 PMP bridge center section • 4 PMP bridge ramp section 	<ul style="list-style-type: none"> • Can support 1 tank or 2 BTRs/BMPs at one time 	<ul style="list-style-type: none"> • 398m: 20 ton bridge <i>OR</i> • 227m: 60 ton bridge • En Bde has the full 32/4 set • En Bn has the 16/2 half set (119m for 60 ton or 181m for 20 ton) Building rate: 7m/min
<ul style="list-style-type: none"> • 4 Rafts can be formed from full 32/4 set 	<ul style="list-style-type: none"> • Each raft = 170 ton capacity or 4 tanks 	<ul style="list-style-type: none"> • 1 raft section = 8 center sections and 1 ramp section



Combat Enemy Engineer Bn Assault Crossing Company



Amphib Plt x2:

- 6x2 - K-61 tracked amphib
or
- 6x2 - PTS tracked amphib
- 3x2 - PKP amphib trailer

Ferry Plt:

- 3x2 - GSP tracked ferry
or
- 4x2 - PMM-2 tracked ferry

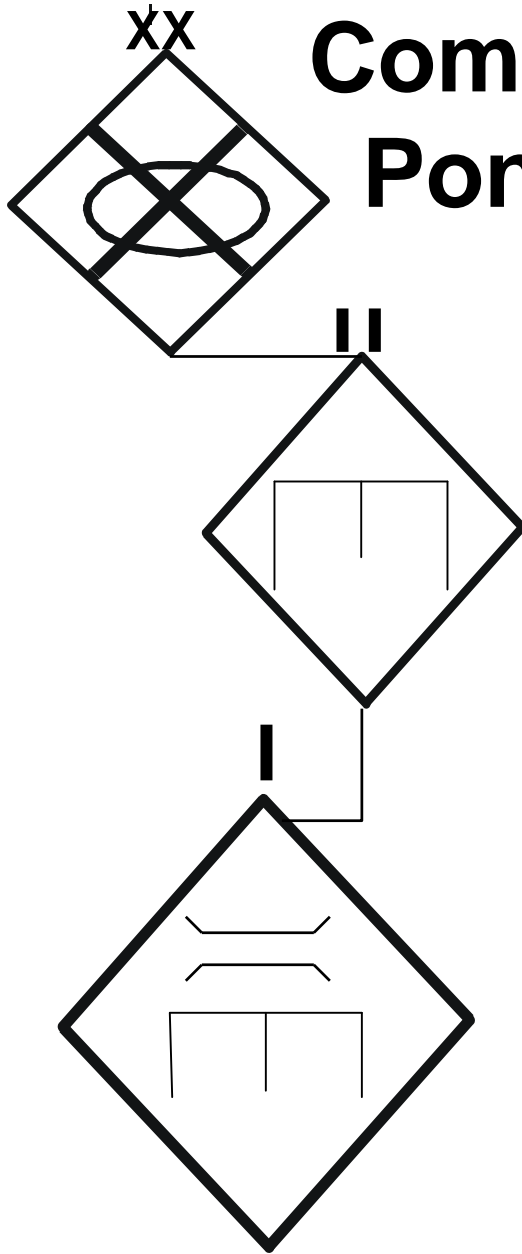
Recon Diving Plt:

- 5x2 - Assault Boat

Assault Crossing Co Capabilities

Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 12 each K-61 tracked amphib 	<ul style="list-style-type: none"> • 600 troops or 1 artillery battery w/ prime movers 	<ul style="list-style-type: none"> • Carries AT, 120mm mortar, 122mm, 152mm & prime movers. 50 soldiers per pay load.
<ul style="list-style-type: none"> • 12 each PTS-M tracked amphib 	<ul style="list-style-type: none"> • 840+ troops or 2 artillery batteries w/ prime movers and crew 	<ul style="list-style-type: none"> • Larger than K-61 • Replaces the K-61 • Is armored • Pulls the PKP trailer
<ul style="list-style-type: none"> • 6 each PKP towed trailer 	<ul style="list-style-type: none"> • Works with PTS-M (see above) 	<ul style="list-style-type: none"> • Artillery transport towed
<ul style="list-style-type: none"> • 6 each GSP Ferry 	<ul style="list-style-type: none"> • 6 tanks or 6 SP howitzers or 8 APC/IFVs 	<ul style="list-style-type: none"> • 3-5 min assembly • Banks no higher than .5 meters
<ul style="list-style-type: none"> • 8 each PMM-2 Ferry 	<ul style="list-style-type: none"> • 8 tanks or 8 SP howitzers or 8 APC/IFVs 	<ul style="list-style-type: none"> • 1 PMM-2 = 1 ferry

Combat Enemy Engineer Bn Pontoon Bridge Company



Pontoon bridge plt x2:

- 8x2 - PMP bridge, center section
- 1x2 - PMP bridge, ramp section

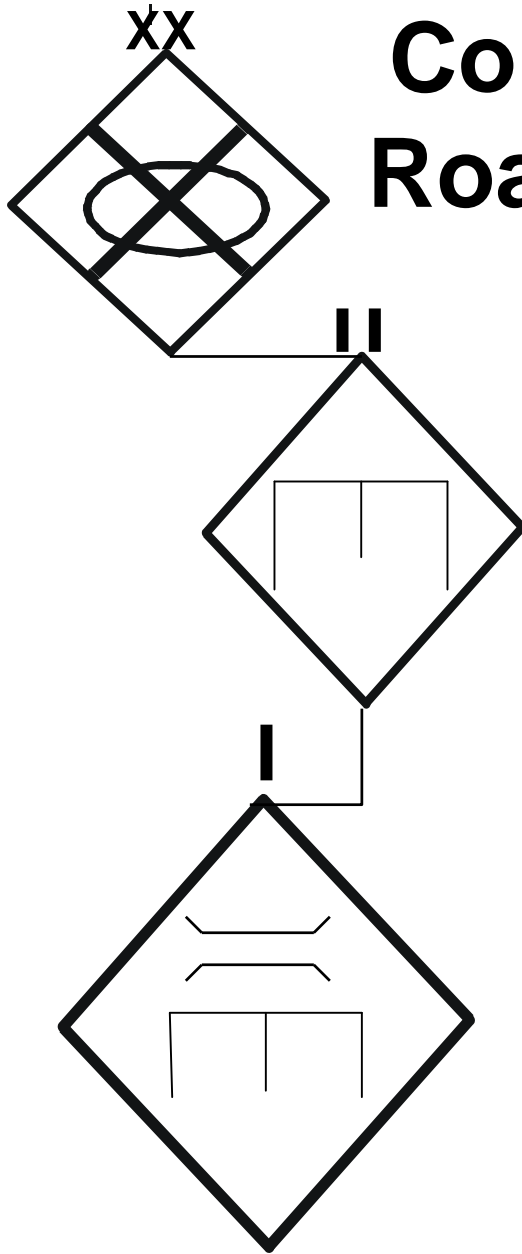
Powerboat plt:

- 3x2 - powerboat

Pontoon Bridge Co Capabilities

Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 16 PMP bridge center section • 2 PMP bridge ramp section 	<ul style="list-style-type: none"> • 60 ton bridge supports 1 tank and 2 BTRs/BMPs at one time • 20 ton bridge supports 2 BTRs/BMPs at one time 	<ul style="list-style-type: none"> • 281m: 20 ton bridge OR • 119m: 60 ton bridge • Engr Bde has the full 32/4 set • Engr Bn has the 16/2 half set
<ul style="list-style-type: none"> • Max 2 Rafts (from their organic half 16/2 set) 	<ul style="list-style-type: none"> • Each raft = 170 ton capacity or 4 tanks 	<ul style="list-style-type: none"> • 1 raft section = 8 center sections and 1 ramp section

Combat Enemy Engineer Bn Road/Bridge Const Company



Road/Bridge Const Plt x2:

- 2x2 - MTU-20 tank launched bridge
- 4x2 - TMM truck launched bridge
- 1x2 - BAT/PKT route clearing vehicle

Road/Bridge Co Capabilities

Equipment	Can Clear (1 pass)	Notes
<ul style="list-style-type: none"> • 8 TMM truck launched 	<ul style="list-style-type: none"> • 1 tank and 2 BTR/BMP can cross one 11.5 span 	<ul style="list-style-type: none"> • Multispan trestle bridge • 4 TMMs = one 42m bridge in 40 to 60 min in day light. Double for night and in water • 1 TMM = 11.5m span
<ul style="list-style-type: none"> • 4 MTU-20 tank launched 	<ul style="list-style-type: none"> • 1 MTU can support 1 tank and 1 BTR/BMP 	<ul style="list-style-type: none"> • 1 MTU = 20m bridge • Launch time: 5 min

Mobility



Combat Enemy Engineers

Movement Support Detachment (MSD)

Missions:

- Route recon
- Mine clearing on the march
- Quick bypass/bridge construction
- Travels in advance of the main body
- Obstacle clearance
- Route marking

Task Organization:

- **Divisional engineer battalion can form 3 MSDs**
- **Army or Corps engineer brigade can form 6**

Breaching Equipment

Equipment	Can Clear	Notes
• KMT-4/6 Plow	• Speed: 6-12kph; Depth = 10cm	• KMT-6M digs mines up
• KMT-5M Roller/Plow	• Speed:6-12 kph Depth:10 cm	• Has luminous lane - marking device
• MTK Line Charge	• Path 140m long x 2m (pressure fuse); 8m (tilt rod) wide	• BTR-50 Chassis • Carries one charge
• MTK-2 Line Charge	• Path 170m long x 3m (pressure fuse); 8m (tilt rod) wide	• 2S1 Chassis; • Carries two charges
• DIM Mine Detector	• Detect metallic mines; Depth:25cm; Speed:10kph	• 7 min operational
• TMM	• 42m gap/40-60 min. in Light • Add 20min@night & 50% in water	• 1 TMM = 10.5m span
• MTU-20	• 20m gap in 5 min	• 5-7 min retrieval time
• BAT- M	• Clears 250 cubic meters/hr	• Crane = 2 mtons
• IRM	• Recon, amphib, mine det	• Sapper Squads

COMBAT ORGANIZATION

Temporary Groupings to Accomplish Missions:

Mobile Support Detachment



A Division Can Form Up To Three,
A Regiment Can Form One

Mission:
Support Route Clearance and Movement for
the Force in Preparation For and During the
March

METT-T Composition w/1 or More of

DIM - Mine Detector

BAT - Route Clearing Vehicle

TMM - Bridge

BTU - Dozer Blade

IMR - Obstacle Clearing Vehicle

MTU/MT55 - Tank Launched Bridge

Tanks w/Plow

Tanks w/Mine Roller

Division MSDs Operate on Main Routes

Regimental MSDs Operate on Supporting Routes

If Enemy Contact is Expected, the MSD Travels Behind the
FSE, Otherwise it Travels Behind the CRP

1 MSD

System Can Clear (100% strgth) 80% 70%

<ul style="list-style-type: none"> • 28 KMT mine-plows 	<ul style="list-style-type: none"> • Each system plows 6-12 kph 	<ul style="list-style-type: none"> • 3 plows per tank company 9 per BN/27 per REG 	
<ul style="list-style-type: none"> • 1 KMT roller 	<ul style="list-style-type: none"> • Rolls over 10-15kph 	<ul style="list-style-type: none"> • 1 per company/3 per BN 9 per REG 	
<ul style="list-style-type: none"> • 1 BAT-M 	<ul style="list-style-type: none"> • Move 250 m of material/hr • 12 hull positions/hr 	<ul style="list-style-type: none"> • Loss negates this capability 	
<ul style="list-style-type: none"> • 1-3 MTK 	<ul style="list-style-type: none"> • Clear 510m of minefield (170m per MTK) 	Clears 340m	Clears 170m
<ul style="list-style-type: none"> • 1-4 TMM 	<ul style="list-style-type: none"> • Bridge four 42 m gap 	3 42m gaps	1 or 2 42m gaps
<ul style="list-style-type: none"> • 1-3 MTU 	<ul style="list-style-type: none"> • Bridge three 20m gaps 	2 20m gaps	1 20m gap

100% MSD Strength

System

3 MSDs (MRD)

6 MSDs (Corps or Army)

• KMT mine-plow	81-Div	• Each system plows 6-12 kph	243-C/A	• Each system plows 6-12 kph
• KMT roller	27-Div	• Each system rolls 10-15kph	81-C/A	•Each system rolls 10-15kph
• BAT-M	3	•750m of material/hr • 36 hull pos/hr	6	• 4500 m of material/hr • 72 hull pos/hr
• MTK	3-6	• Clears 510-1020 m of minefield	6-12	•Clears 1020-2040m •170m per MTK
• TMM	3-12	• Span up to twelve 42m gaps	6-24	•Span up to twenty-four 42m gaps
• MTU	3-6	• Span up to six 20m gaps	6-12	•Span up to twelve 20m gaps

80% MSD Strength

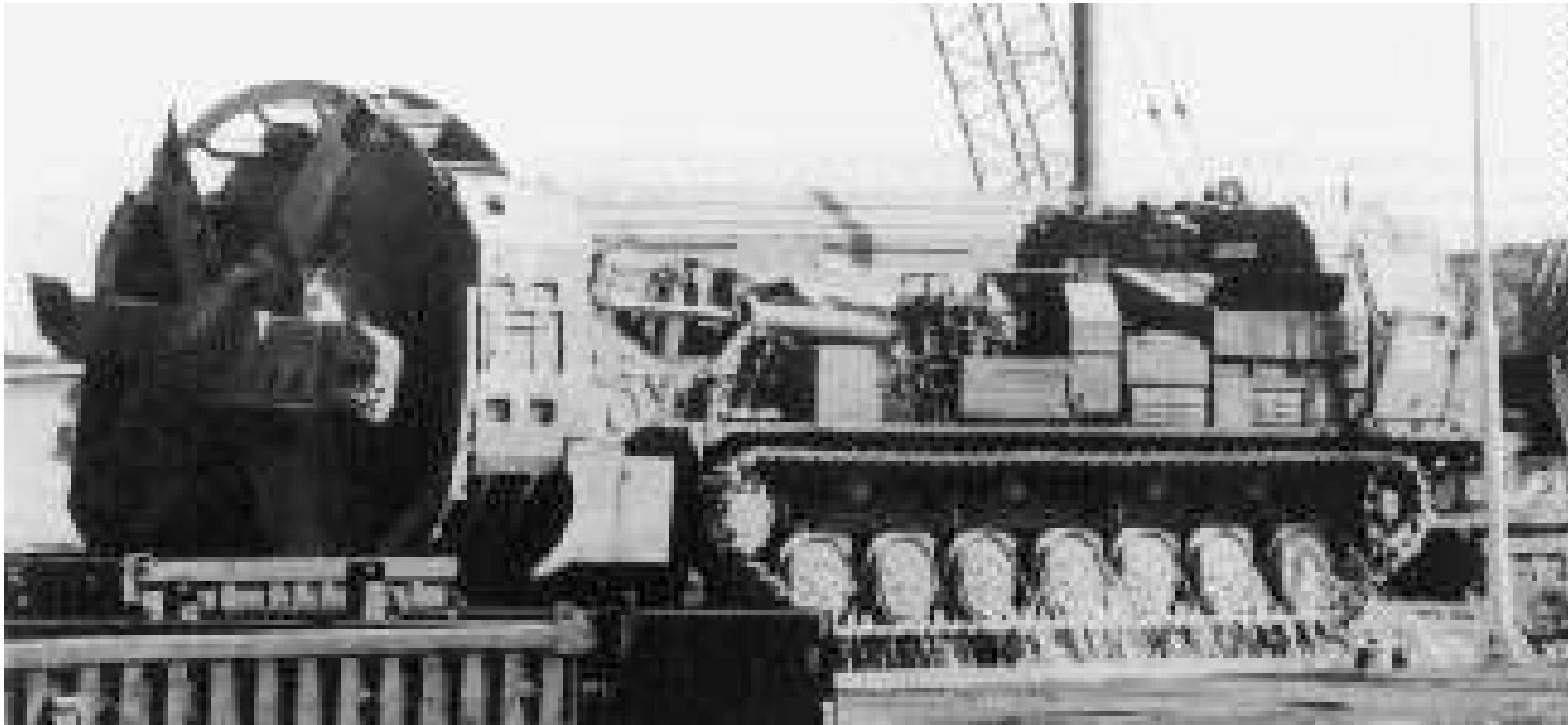
System	3 MSDs (MRD)	6 MSDs (Corps or Army)
• KMT mine-plows	75	• Each system plows 6-12 kph
• KMT roller	20	• Each system rolls 10-15kph
• BAT-M	2	• 750m of material/hr • 24 hull pos/hr
• MTK	2-5	• Clears 510-1020 m of minefield
• TMM	2-10	• Span up to ten 42m gaps
•MTU	2-5	• Span up to five 20m gaps

70% MSD Strength

System **3 MSDs (MRD)** **6 MSDs (Corps or Army)**

• KMT mine-plows	65	• Each system plows 6-12 kph	175	• Each system plows 6-12 kph
• KMT roller	14	• Each system rolls 10-15kph	65	• Each system rolls 10-15kph
• BAT-M	1	• 250m of material/hr • 12 hull pos/hour	3	• 750m of material/hr • 36 hull pos/hr
• MTK	1-4	• Clears 170-680 m of minefield	3-8	• Clears 510-1360m of minefield
• TMM	1-8	• Span up to eight 42m gaps	3-17	• Span up to seventeen 42m gaps
• MTU	1-4	• Span up to four 20m gaps	3-8	• Span up to eight 20m gaps

Counter mobility



Combat Enemy Engineers

Mobile Obstacle Detachment (MOD)

Missions:

- **Normally operates w/ anti-tank reserves**
- **Positioned along flanks or rear**
- **Lays minefields, digs AT ditches, emplaces demolitions**

Task Organization:

- **Formed at every level (Co, BN and BDE)**
- **Eng Companies organic to Maneuver Brigades form MODs for those Brigades**

MODs

XXth Armored Corps MODs

»(2 MODs) with IMRBs

»(3 MODs) with Obstacle Companies of Obstacle Bn

»(2 MODs) ENG Bn of the ENG Bde of xxth AC

»Total MODs usable by Corps = 7 MODs

·Each MOD lays 3 standard 300x120m minefields (4 rows) in 26 min. (surface) or 52 min. (buried)

·Dig-in 36 vehicles per hour

»1 Obstacle CO assigned to AC

·Obstacle Co can emplace up to 9 standard minefields (same time as above)

·**TOTAL POSSIBLE MINEFIELD FRONTAGE for Corps:
6300m @ 4 rows or 7245m @ 3 rows**

COMBAT ORGANIZATION

Temporary Groupings to Accomplish Missions:

Mobile Obstacle Detachment



Formed From Division and Regimental Engineer Units

Mission:
Deny Key Terrain or Avenues
Particularly if Favorable to
Armor

**Reinforced
By:**



Or



On an Open Flank

or

In a Central Position to Deploy to
aThreatened Axis

METT-T Composition w/1 or More of
Sapper Squad
GMZ/PMR- Mechanical Minelayer
MDK2/BTM - Ditching machine
UMZ: "Volcano" system

1 MOD (Co level)

System	Can Do (100% strgth)	80%	70%
<ul style="list-style-type: none"> • 1-2 Sapper squads (hand emplaced mines) 	<ul style="list-style-type: none"> • Can surface lay 1-2 300 x 90m standard minefield in 90 minutes 	<ul style="list-style-type: none"> • 1 sapper sqd emplace 1 300x90m minefield in 90 min. 	<ul style="list-style-type: none"> • Less than 1 sapper sqd eliminates capability
<ul style="list-style-type: none"> • 3 GMZ/PMR mechanical minelayers 	<ul style="list-style-type: none"> • 900 meters of minefield in <ul style="list-style-type: none"> - 1.5 hour for surface - 3 hours for buried • standard minefield size= 300x120m (4 row) 	<ul style="list-style-type: none"> • 2 GMZ/PMR: 600 m in 1 hour (surface) 2 hrs (buried) 	<ul style="list-style-type: none"> • 1 GMZ/PMR: 300m in 30min (surface or 1 hr (buried)
<ul style="list-style-type: none"> • 3 MDK2/BTM ditchers 	<ul style="list-style-type: none"> • 36 Tanks/APC/IFV hull defilade in one hour • 750 m of ATD per hour 	<ul style="list-style-type: none"> • 2 MDK-2/BTM dig in 24 veh. in 1 hour • 500m ATD/hr 	<ul style="list-style-type: none"> • 1 MDK-2/BTM digs 12 veh/hr • 250 ATD/hr

Base Capabilities

1 MOD (Co level)

System	25 days*	Notes	2 MODs**
<ul style="list-style-type: none"> •1-2 Sapper squads (hand emplaced mines) 	<ul style="list-style-type: none"> • Can surface lay 90 km 	<ul style="list-style-type: none"> • Can surface lay 600 metes in 2 hours • 3600m per day (12 hr work day) 	<p>N/A</p>
<ul style="list-style-type: none"> • 3 GMZ/ PMR mechanical minelayers 	<ul style="list-style-type: none"> • 540 km surface laid minefield <li style="text-align: center;">OR •270 km buried laid minefield 	<ul style="list-style-type: none"> • 7.2km surface laid minefield per day per GMZ <li style="text-align: center;">OR • 3.6 km buried minefield per day per GMZ 	<ul style="list-style-type: none"> •1620 km surface laid minefield <li style="text-align: center;">OR •810 km buried laid minfield
<ul style="list-style-type: none"> • 3 MDK2/ BTM ditchers 	<ul style="list-style-type: none"> •225 km ATD 	<ul style="list-style-type: none"> • 250 m of ATD per hour per system • 3km of ATD per 12 hour day <li style="text-align: center;">OR • One MDK: 12 hull defilade position per hour. Or 144 vehicles per day 	<ul style="list-style-type: none"> • 675 km ATD

* Assumes 12 hour work days & 100% equipment OR rate

** Assumed pushed down by Corps

*** All Combat vehicles in IMRB dug in

1 MOD (Bn level)

System	Can Do (100% strgth)	80%	70%
•1-4 Sapper squads	<ul style="list-style-type: none"> • Lay 4 300x90m minefields in 90 minutes 	<ul style="list-style-type: none"> • 3 squads: • 3 minefields in 90 min. 	<ul style="list-style-type: none"> •2 squads: • 2 minefields in 90 min
•3 GMZ/PMR	<ul style="list-style-type: none"> • 900 meters of minefield in <ul style="list-style-type: none"> - 1.5 hour for surface - 3 hours for buried •Standard minefield size= 300x120m (4 row) 	<ul style="list-style-type: none"> • 2 GMZ/PMR: 600 m in 1 hour (surface) 2 hrs (buried) 	<ul style="list-style-type: none"> • 1 GMZ/PMR: 300m in 30min (surface or 1 hr (buried)
•3 UMZ	<ul style="list-style-type: none"> •3,300m of minefield in 3 hrs •Standard minefield: 4 row 13000 x 120m 1 hr 	<ul style="list-style-type: none"> • 2 UMZ: 2200m in 2 hours 	<ul style="list-style-type: none"> •1 UMZ: 1,100m in 1 hour
• 4 MDK2/BTM	<ul style="list-style-type: none"> • 48 hull defilade positions in 1 hour •1000 m of ATD per hour 	<ul style="list-style-type: none"> • 2 MDK2/BTM • 24 hull defilade positions/hours •500m ATD/hr 	<ul style="list-style-type: none"> •1 MDK-2/BTM: •12 hull pos/hr • 250m ATD/hr

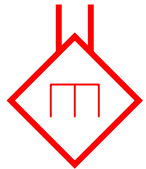
2 MODs (Bde level)

System	Can Do (100% strgth)	80%	70%
<ul style="list-style-type: none"> • 6 GMZ/PMR mechanical minelayers 	<ul style="list-style-type: none"> • 1800 meters of minefield in <ul style="list-style-type: none"> - 3 hours for surface - 6 hours for buried • Standard minefield size= 300x120m (4 row) 	<ul style="list-style-type: none"> • 5 GMZs: 1500m of minefield in 2.5 hrs (surface) or 5 hrs (buried) 	<ul style="list-style-type: none"> • 4 GMZs: 1200m in 2 hrs (surface) or 4 hrs (buried)
<ul style="list-style-type: none"> • 6 UMZ mechanical minelayers 	<ul style="list-style-type: none"> • 6,600m of minefield in 6 hrs • Standard minefield: 4 row 13000 x 120m 1 hr 	<ul style="list-style-type: none"> • 5 UMZs: 5500m in 5 hours 	<ul style="list-style-type: none"> • 4 UMZs: 4400m in 4 hrs
<ul style="list-style-type: none"> • 8 MDK2/BTM ditchers 	<ul style="list-style-type: none"> • 96 vehicles hull defilade positions per hour • 2000 ATD per hour 	<ul style="list-style-type: none"> • 6 MDK2/BTM • 84 vehicles hull defilade pos/hr • 1500m ATD/hr 	<ul style="list-style-type: none"> • 5 MDK2/BTM • 60 vehicles hull defilade pos/hr • 1250 ATD/hr

Survivability



ENGINEER BASE CAPABILITIES



Excavate Up To 96 Hull-Down Fighting Positions in 1 Hour.....(At Best)

8 X **BAT-M/BAT-2 Route Clearing Vehicle**
Dozer Blade - 200 cu meter/hr
Crane - 2 mt
Planning Factor - 6 Vehicle Positions/hr

And

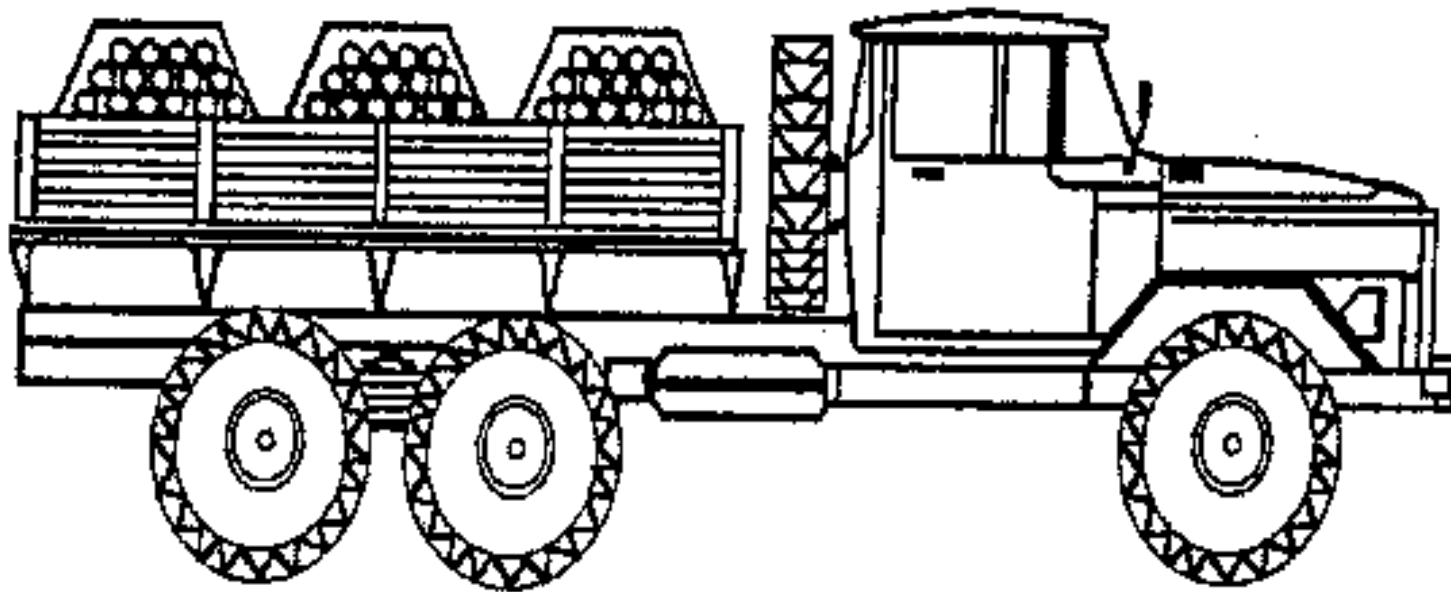
4 X **MDK-3 Ditching Machine**
Digging - 400-500 cu meter/hr
Planning Factor - 12 Vehicle Positions/hr

**Or, Using MDKs for AT Ditches, 336 m of AT Ditches in 1 Hour
(444m if equipped w/BTM)**

Survivability

Equipment	Can Emplace (MAX)	Notes
•MDK-2 ditcher	•12 vehicles hull defilade in 1 hr	• Most units will have this with BTM
•MDK-3 ditcher	•20 vehicles per hour (defilade hull)	• Newer armored version of MDK-2
•BTM ditcher	•1120 m of trench in 1 hour	•Meters of trench depends on many variables (Maintenance)
•PZM-2 ditcher	•10 vehicles in 1 hour (hull defildade)	•Can be airdropped
•TMK-2 trencher	•24 vehicles per hour	•Other uses: road maint snow plow, NBC decon
• Self - entrenching	•T72/T80 3 to 4 meters /30 min	

FASCAM



FASCAM Capability

<u>System</u>	<u>Frontage/ Depth</u>
•BM-21/22	•490x490m 900x900m
•2S3	•No Info
•Air-Rotary	•200 x 800m
•Air-Fixed wing	•200 x 800m
•Astros II	•1 Battery; 3Km •Standard: 500m x 120m
•WM-80	• 400x200m

- All systems can emplace AT or AP mines
- Assume worst case: Blast Besistant
- AT mines: PTM-3, PTM-1S
 - PTM-3-blast resistant
 - PTM-1S-not blast resistant
- All AP mines are self destruct type
- Self destroy times vary from 1 hour to 12 days.

FASCAM SYSTEMS

EXAMPLE 1 of 2

XXth CORPS has:

»4 WM-80: *Each can emplace 400x200m of FASCAM minefield*

· *Total WM-80 frontage: 1600m or 800m depth*

»Air fixed wing: *1 can emplace a 500x120m minefield. Used in ground support role*

· *AC has 40% of 18 SU-24s, 10 Mirages, 30 Tornados, 5 AMXs*

· *Allocates 25% of those to 39th AC*

· *approx: 4 SU-24, 2 Mirages, 7 Tornados, 1 AMX*

»Air rotary: *1 can emplace a 200x800m minefield, mine dispenser pods placed under any rotary wing aircraft*

· *A Corps has 40% of 10 HOKUMs and 7 HIPs*

· *Allocates 25% of those to 39th AC*

· *approx: 2 HOKUMS, 1 HIP*

FASCAM SYSTEMS

EXAMPLE 2 of 2

XXth TD has:

»18 ASTROS II:

»can influence our AO

»all 18 can lay up to 9 k of FASCAM

»ranging out to 22k

»Doctrinal usage:

»FASCAM will fire close to friendly positions covered by direct fires or laid deep in enemy territory

»used to cause confusion or to trap and disorder attacking units

»fired directly before or during combat; laid to front of attacking, reinforcing or withdrawing forces or on top of enemy formations

»isolate or block; prevent artillery displacement

Vehicles and Systems



WCOPFOR DITCHING MACHINE CAPABILITES (FM 100-60)

<u>System</u>	<u>System Notes</u>
MDK-2	Digs field positions, AT ditches, gun pits, vehicle concealment/ can excavate up to 300 cubic m of soil/hour Cannot excavate in rocky or frozen terrain. Cannot be helolifted or airdropped.
MDK-3	Same as above but does up to 500 cubic m/hour and is armored with NBC protection system Cannot be helolifted or airdropped.
BTM	Low road speed= 35km/hour. Works at max: 1120m/hour. Cannot be helolifted or airdropped but can be transport carried.
PMZ-2 (Tractor, modified)	Dig up to 250m/hour. Can be helolifted or airdropped.
TMK-2	Dig up to 600m/hour



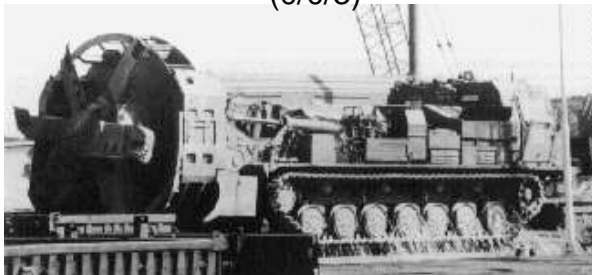
TMK-2 trenching machine
(0/0/3)



BTM ditching machine
(8/4/0)



PZM-2 ditching machine
(0/0/3)



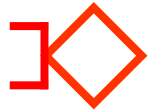
MDK-3 ditching machine (8/4/1)



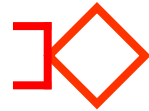
MDK-2 ditching machine (8/4/1)

WCOPFOR BREACHING CAPABILITES (FM 100-60)

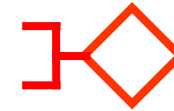
<u>System</u>	<u>System Notes</u>
KTM 4/6 (Plow)	Digs up mines (6-12 kph) instead of simply detonating them. Lighter than roller system.
KTM 5 (Roller)	Can withstand up to 9 explosions/ has a driver controlled quick-release system (10-15kph)
MTK/MTK-2 (MICLIC)	Clears up to 170m of minefield
IMR/IMR-2 (Breacher)	360 degree traversible crane can move between 5 and 11 metric tons



KTM-4 (18/9/3)



KTM-6 (18/9/3)



KTM-5 (6/3/1)



MTK (12/6/3)
140m



MTK-2 (12/6/3)
180m



IMR (4/2/1)



(IMR-2 4/2/1)

Note: (Number in EN BDE/ Number in EN BN/Number in CO)

WCOPFOR BREACHING CAPABILITES (FM 100-60)

System

System Notes

BAT-M

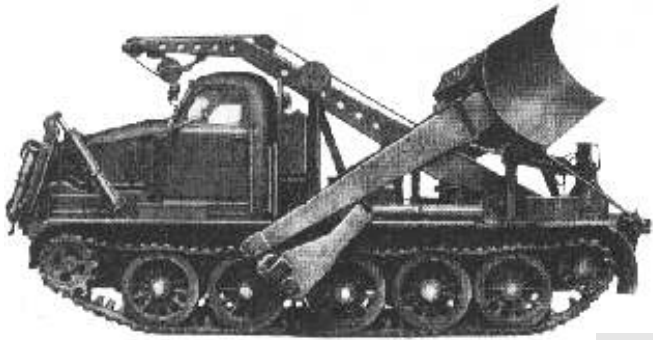
2 section adjustable dozer blade and a rotary crane. Crane capacity is 2 metric tons

DIM

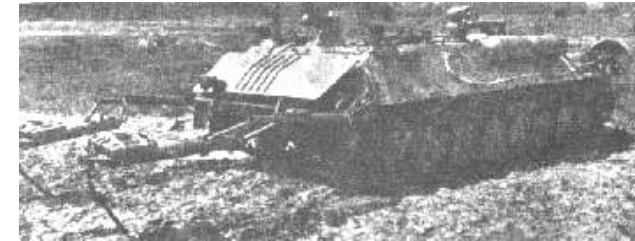
Can detect mines at a depth of 25cm while traveling at 10kph

IRM

Amphibious recon vehicle. Mine detector/soil analysis/sonar (water depth)/1 sapper squad



BAT-M)16/8/1)



IRM Engineer Recon Vehicle 15/2/0)



DIM
Mine Detection vehicle
(6/3/1)

Note: (Number in EN BDE/ Number in EN BN/Number in CO)

WCOPFOR BREACHING CAPABILITES (FM 100-60)

System

System Notes

MTU-20

T-55 chassis/ Bridge span 20m. 5-7 minutes launch and retrieval times

TMM

Multi-span, trestle supported bridge. 4 TMM = 42m class 60 bridge. 40-80 min. to prepare.

PMP

Pontoon bridge set = 32 center pieces/ 4 ramp pieces. Can make a bridge or form rafts. Bridge can carry 1 tank and 2 APC/IFVs. Raft can carry 4 tanks



MTU-20 tank launched bridge (12/4/2)



TMM truck launched bridge (16/8/4)



PMP pontoon bridge (36/18/0)

Note: (Number in EN BDE/ Number in EN BN/Number in CO)

WCOPFOR BREACHING CAPABILITES (FM 100-60)

System

System Notes

GSP

Can carry tanks, arty, troops or vehicles. 6 tank/SP arty capacity. 2 GSPs make 1 ferry.

PMM-2

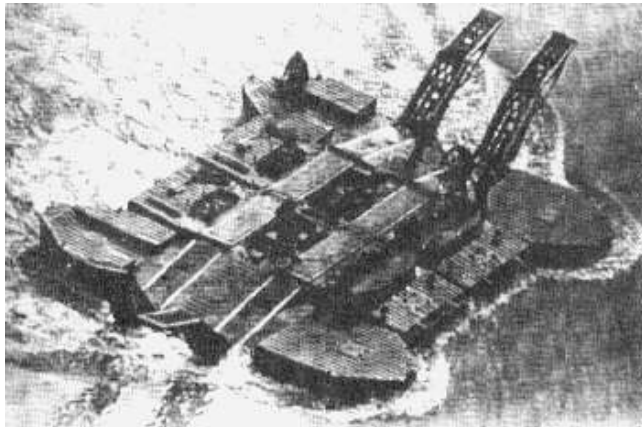
Replacing the GSP. 1 vehicle makes 1 ferry. Same carrying capacity as the GSP.

K-61

Can carry 600 troops or 1 arty battery. Primarily an artillery mover. Light armored amphibian

PTS-M

Replaces the K-61. Heavier armor. Pulls the PKP trailer. Double the carry capacity of the K-61



GSP tracked ferry (0/6/0)



PTS-M tracked amphib (36/12/0)



PMM-2 Tracked ferry (72/8/0)



PTS-M tracked amphib (36/12/0)

Note: (Number in EN BDE/ Number in EN BN/Number in CO)

WCOPFOR ENGINEER MINELAYING CAPABILITES (FM 100-60)

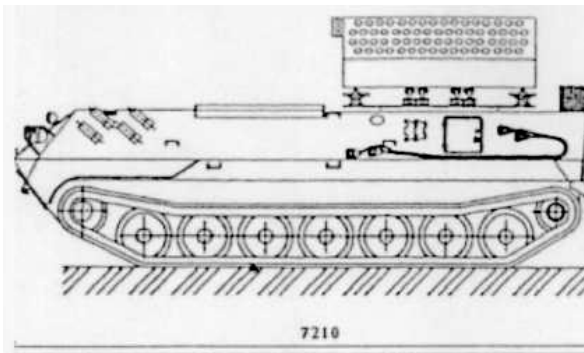
<u>System</u>	<u>System notes</u>
GMZ (Mech Minelayer) PMR-3†	Holds a total of 208 mines. Lays 8 mines (surface) per minute or 4 mines (buried)/min Towed vehicle with similar capabilities to GMZ/ Towing vehicle holds 200-300 mines
UMZ (Scat Minelayer)‡	Lay 180-11,520 mines without reload (minefield type dependent)/ 1.5 - 2 hours reload time/ 1 UMZ can lay 1four row minefield that is 12,960m front (mine type dependent)/ can launch mines from 30-60 distance at speed of 10-40kph.

† *Some units may have PMR-3 towed minelayers instead of GMZ armored, tracked minelayers. Trucks normally tow PMR-3 minelayers.*

‡ *The **Mine Warfare Company** of the infantry or tank division **Engineer Battalion**, may have a second minelayer platoon equipped with the truck-mounted UMZ.*



GMZ (6/3/3)



109 (UMZ 6/3/0)



PMR-3 (6/3/3)

Note: (Number in EN BDE/ Number in EN BN/Number in CO)