SECTION 20

FORMAT: AN ENGRINEER PROJECT TO SUPPORT XXX INFANTARY BRIGADE IN ITSOCCUPATION OF DEFENCE

For	:	Project Number	:
By	:	Rank	:
Appointment	:	Unit	:
At	:	Date Time Group	:

Reference :

A. Bangladesh Map Sheets 78 $\frac{D}{15}$, $\frac{D}{16}$, $\frac{H}{3}$,$\frac{H}{4}$,1: 50000.
B. Exercise Paper "Exercise –DURGOMDURGO"
C. Précis on Mine Warfare, Demolition, Heavy Pontoon Bridge, ERPB and ESPB.

Time Zone Used Through out The Project: FOXTROT

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Internal:

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SUMMARY

1. **Aim**. To Support XXX Infantry Brigade in its Occupation of defense in general area AHMEDPUR by 0500 hours 30 Jul 2013 with following limitations:

a. No work to be done during day hours except recce.
b. Dumping of stores to be completed by 281700 Jul 2013.

2. **General Description of the Site**. The area is generally open and flat, interspersed with villages and cultivated lands. A no of roads and tracks criss-cross the area. This area is thickly vegetated which provide good c/c. The existing metalled roads can take all types of vehicle including plants**.** X-Country movement is possible during dry season. There are no of marshes at the southern part of this area which restricts Mobilization.

a. **Type of Soil**. Dry and sandy.

b. **Cover and Concealment**. Good and around the villas.

c. **Approach**.

(1) NATORE-AHMEDPUR-BONPARA.
(2) TEBARIA-BEORAPARA-TONAKPUR.
(3) BARAIGRAM-BIASPAR-SALANGA-NALKA.

d. **Obstacles**

(1) River ATRAI
(2) River KARATOA
(3) River ICHAMATI
(4) SUTI Khal.
(5) River KALUDAHA

3. **Effects of Weather.** Moderate and occasional to heavy rainfall would hamper the mobility of troops. Exercise of tasks will be delayed. Therefore, the tasks may require more time.

4. **Important Timings.**

a. No move before 151900 Jul 2013 except engineers.
b, Dumping of store to be completed by 281700 Jul 2013.
c. No work to be done during day hours except recce.
d. Task to be completed by 300500 Jul 2013.

e. **Forward Dumping Starts by.**

(1) Task Force-A. 160000 Jul 2013.
(2) Task Force -B. 160000 Jul 2013.
(3) Task Force -C. 160000 Jul 2013.
(4) Task Force -D. 160000 Jul 2013.

f. **Total Time Available**.

(1) Total Night Time. 160 hours.
(2) Total Platoon hours. 480 Platoon hours.

g. En Interference. En's air activities may interfere.

5. **Section**. Provided by Infantry Brigade.

6. **Out line Plan**. Attach as Annex A

7. **Summary of Calculation**. Attach as Annex B

8. **Drawing and Sketches**. Attach as Annex C

9. **Detail Calculation.** Attach as Annex D

10. **Work Party Table**. Attach as Annex E

11. **Store List**. Attach as Annex F

12. **Transport Schedule**. Attach as Annex G

13. **Job Private List**. Attach as Annex H

14. **Work Program**. Attach as Annex J

XXX
Lt
OC, XXX Field Company

Annexes:

A. Outlinr Plan.
B. Summary of Cal.

C. Drawing and Sketches.
D. Detail Cal.
E. Work Party Table.
F. Store List.
G. Transport Schedule.
H. Job Priority List.
J. Work Program.

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ANNEX A TO
ENGINEER PROJECT
DATED: ……

OUT LINE PLAN

1. **MISSION**. Support XXX Infantry Brigade in its occupation of defense by 0500 hours--------.

2. **EXECUTION**.

a. **General Outline**. Tasks will be Executed by 4xTask Forces composed of 3xPlatoon and 1xPlant Platoon.Task has been allotted to the Task Force's to specific area. Task Forces are as following:

(1) Tasks Force A. Number 1 Platoon.
(2) Tasks Force B. Number 2 Platoon.
(3) Tasks Force C. Number 3 Platoon.
(4) Tasks Force D. Plant Platoon.

b. Task Force A.

(1) Commander. Platoon commander Platoon-1.
(2) Group. Integral.
(3) Tasks.

(a) Lay defensive minefield D1 (2000^{x}) in General area xxxx
(b) Lay defensive minefield D4 (2000^{x}) in SQUARE 9199, 9298.
(c) Lay axial mining of 15000^{x} in SQUARE 9206.
(d) Prelim Demolition of bridge DATTAPARA.
(e) Road cratering R1 of 500^{x} each at SQUARE 0004 and 0005
(f) Road cratering of 200^{x} at SQUARE 9692.
(g) Lay wire obstacle W1 of 1000^{x} at SQUARE 8512,8624
(h) Launch 100 feet Pontoon bridge in BAGAHAT

C. **Task Force -B.**

(1) Commander. Platoon commander Platoon-2.
(2) Group. Integral.

(3) Tasks.

(a) Lay defensive minefieldD5 of 1200^{x} at SQUARE 8490, 8491.
(b) Lay defensive minefield D3 of 1500x at SQUARE 9794.
(c) Lay defensive minefield D2 of 1000^{x} at SQUARE 9604.
(d) Lay axial minting A2 of 1500^{x} at SQUARE 9391.

(e) Prelim demolitionl-2 of TEBARIA Br.
(f) Road cratering R2 of 200[x] at SQUARE 9506.
(g) Road cratering R4 of 400[x] at SQUARE 9203.
(h) Road cratering R5 of 500[x] at SQUARE 8301.
(j) Road cratering R6 of 200[x] at SQUARE 8287.
(k) Lay wire obstacle W2 of 1200[x] at SQUARE 9506.
(l) Establish Brigade WP in BAGHATIPARA.

d. **Tasks Force-C.**

(1) Commander. Platoon commander Platoon-3
(2) Group. Integral.
(3) Tasks.

(a) Lay defensive minefield D6 of 1000[x] at SQUARE 8406.
(b) Lay defensive minefield D7 of 1500[x] at SQUARE 8297.
(c) Lay defensive minefield D8 of 2500[x] at SQUARE 8292.
(d) Lay nuisance mining at SQUARE 8102.
(e) x1, nuisance mining of Xing site at SQUARE 9694.
(f) x2, nuisance mining of Xing site at SQUARE 9191.
(g) Lay wire obstacle W3 of 500[x] at SQUARE 9205.

e. **Task Force-D.**

(1) Commander. Platoon commander, Plant Platoon.
(2) Group. Integral.
(3) Tasks. Prep Anti-tank ditch of 2000[x] at SQUARE 9105.

f. **Coordinating Instruction**

(1) Timings.

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(a) NMB 151900 Jul 2013 except engineers.
(b) Dumping to be completed by

. i. Task Force-A. 16 0000 Jul 2013.
ii. Task Force-B. 160000 Jul 2013.
iii. Task Force-C. 160000 Jul 2013.
iv. Task Force-D. 160000 Jul 2013.

(2) Location of Dumps.

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i. Task Force -A. LALPUR.
ii. Task Force -B. BAGATIPARA.
iii. Task Force -C. KANCHUTIA.
iv. Task Force-D. AHMEDPUR.

(3) Task Force's commanders will select different store sites and their work sites for easily accomplishing their tasks.

(4) Vehicles. TASK FORCE will use their integral vehicle and B vehicle which is allotted from XXX Infantry Brigade.

(a)	3 ton lorry	- 8 Nos.
(b)	1 ton pickup	- 5 Nos.
(c)	Jeep	- 1 No.

3. **SERVICE SUPPORT**.

a. Administrative Order. Will be issued later on.

b. Medical.

(1) Advanced Dressing Station. Advanced Dressing Station will be near BAA at DASURIA.

(2) Main Dressing Station. xxxx.

c. Food and Personal Admin. As per Standing Operating Procedure.

4. **COMMAND AND SIGNAL.**

a. Location.

(1) Headquarter XXX Infantry Brigade**.** DANGAPARA.

(2) Headquarter XXX Field Company. DANGAPARA.

b. Communication Net Diagram. Issued later on.

c. Electronic Silence. Issued later on.

d. Code Words. Issued later on.

e. Nick Names. Issued later on.

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ANNEX B TO ENGINEER
PROJECT
DATED: ……

SUMMARY OF CALCULATION

Serial	Task	Time Requirement (Platoon hour)	Explosive and Minute Requirement	Remarks
(a)	(b)	(c)	(d)	(e)
1.	D1	41.4	Anti-Tank Mine 5880 Anti-Personnel Mine 11720	
2.	D4	41.4	Anti-Tank Mine 2904 Anti-Personnel Mine 5880	
3.	A1	30	Anti-Tank Mine 1500 Anti-Personnel Mine 4300	
4.	Prelim Demolition-1	16	Explosive 1320 lb	
5.	R1	6.34	Explosive 2660 lb	
6.	R3	1.27	Explosive 532 lb	
7.	W1	4.5		
8.	100 feet Pontoon Bridge	1		
So, Total Time Requirement = 141.91 ≅142 Platoon hour				

2. **Task Force-B**

Serial	Task	Time Requirement (Pl hour)	Explosive and Mine Requirement	Remarks
1.	D5	24.84	Anti-TankMine8528 Anti-Personnel Mine 7032	
2.	D3	31	Anti-TankMine2205 Anti-Personnel Mine 4395	
3.	D2	20.7	Anti-Tank Mine 2940 Anti-Personnel Mine 4500	
4.	A2	30	Anti-Tank Mine 1500 Anti-Personnel Mine 4500	
5.	Prelim Demolition-2	10	Explosive 1095 lb	
6.	R2	1.27	Explosive 532 lb	
7.	R4	2.54	Explosive 1064 lb	
8.	R5	3.17	Explosive 1330 lb	

Serial	Task	Time Requirement (Pl	Explosive and Mine Requirement	Remarks

		hour)		
9.	R6	1.27	Explosive 532 lb	
10.	W2	8	-	
11.	Brigade Water Point	3	-	
So, Total time Requirement= 136 Pl hour				

2. **TASK FORCE-C**

Serial	Task	Time Requirement (Platoon hour)	Explosive and Mine Requirement	Remarks
(a)	(b)	(c)	(d)	(e)
1.	D6	20.7	Anti-TankMine2940 Anti-Personnel Mine 5860	
2.	D7	31.05	Anti-TankMine4410 Anti-Personnel Mine 8790	
3.	D8	51.75	Anti-Tank Mine 3675 Anti-Personnel Mine 7325	
4.	Nuisance Mining	10	Anti-Tank Mine 500 Anti-Personnel Mine 1500	
5.	Reserve Demolition	18	Explosive 1182 Ib	
6.	x1	6	Anti-Tank Mine300 Anti-Personnel Mine 900	
7.	x2	6	Anti-Tank Mine 300 Anti-Personnel Mine 900	
8.	W3	2.5	-	
So, Total time Requirement= 146 Platoon hour				

4. **Task Force -D**. Prepare Anti-tank ditch of 2000^{x}. Total time 73.18 Platoon hour.

ANNEX C TO ENGINEER
PROJECT
DATE: ……..

DETAIL CALCULATION

Detail Calculation

1. **Defensive Mine Field D1 of 1500^{x}**.

a. Given Data

(1) Effectiveness- 70%.
(2) Number of mixed strip - 2 (Outer and Inner).
(3) No of Anti-Personnel mines/cluster- 4.
(4) 25% of mixed clusters of outer strip will be trip wired.
(5) Depth - 500 (considering summer).
(6) Turning Point-2

b. Store and Transport Calculation.

(1) Effectiveness - 70%, so density $1\frac{1}{3}$ or $\frac{4}{3}$.
(Auth: GSTP-1626 chapter 1 table 1)

(2) Number of strips $= \frac{\text{Desired density}}{\text{Standard density}} = \frac{4/3}{1/3} = 4$

(3) Number of cluster per strip = Frontage x standard density
$= 1500 \text{x} \frac{1}{3}$
$= 500$
Number of mixed strip = 2.
So Anti-tank strip = (4-2)
=2

(4) Anti-Tank Mines.

Anti-Tank Mines= (No of mixed strip + No of Attack Strip) x Number of cluster/Strip + 10%
= (2+2) x 500 + 10%
= 2200

(5) Anti-Personnel Mines.

Anti-Personnel mines = (4x Number of mixed strip x Number of cluster/Strip) + 10%.

= (4x 2x 500) + 10%

= 4400.

(6) Long Pickets = [{(Frontage + 2x Depth)/20} +1] + 10%

= {(1500+2x500)/20+1} +10%

= 138.6

≅ 139

(7) Short Pickets = {(Frontage/20+2x total Tp+2x No of strip + (No of strips x Frontage/100)} +10%

$= (\frac{1500}{20} + 2x4 + 2x4) + (4 \times \frac{1500}{100}) + 10$

= 174.9

≅ 175

Considering Turning point per strip = 2.

So total Turning point = 4x2=8

(8) Barbed wire coil = (3x Frontage + 4x Depth)/100

= (3x 1500 + 4x 500)/100

= 65

(9) Perimeter sign posting = (2x Frontage + 2x Depth)/40

= (2x 1500 + 2x 500)/40+10%

= 110

(10) Tracing tape = (Number of strips x Frontage + 2x Depth of guide tape)/50+10%

= (4x 1500 + 2x 500+200)/50+10%

= 158.4

≅ 159

(11) Transporter.

(a) For Anti-Tank Mines $= \frac{2200}{440} = 5$ lorry.

Considering Anti-Tank Mines Mark 5 HC.

(b) For Anti-Personnel Mines= $\frac{4400}{4500} = 0.98 \cong 1$ lorry

Considering Anti-Personnel Mine Number 6.

c. **For Stores**.

(1) For barbed wire 3 ton lorry Requirement $= \frac{65}{24} = 2.7 \cong 3$ lorry.

(2) For long pickets 3 ton lorry Requirement $= \frac{139}{100} = 1.39 \cong 2$ lorry.

(3) For short pickets 3 ton lorry Requirement $= \frac{175}{50} = 3.5 \cong \mathbf{4}$ lorry.

(4) For perimeter signs 3 ton lorry Requirement $= \frac{110}{75} = 147 \cong 2$ lorry.

Considering highest number of 3 ton lorry, total 4x3 ton lorry Required.

d. For Personnel 3 ton lorry Requirement $= \frac{\text{Total persons}}{28}$ [1x Engineer Pl=51]

$= \frac{51}{28}$

$= 1.82$

$\cong 2$

So, Total 3 ton lorry Requirement = lorry for (Anti-Tank Mines + Anti-Personnel mine+ store + persons)

= 5+1+4+2

= 12 lorry

(Auth: GSTP-1626, minefield laying calculation page 55)

e. Time Calculation. For unforeseen sit, we will consider all through dark night.

(1) 1X Engineer Platoon can lay 100 Anti-Tank Mine in 60 minute.

(2) 50 mixed cluster in 60 minute.

(3) $\frac{75}{2} = 37.5$ mixed tripped wire cluster in 60 minute.

(Auth: GSTP-1626, minefield laying calculation page 58)

(4) D Night. Total night time available = 10 hours = 600 min.

For Outer Strip.

Total mixed cluster = 500
Tripped wire cluster = 500 x 25% = 125.
For 37.5 tripped wire cluster time Requirement = 60 min
For 125 tripped wire cluster time Requirement = $\frac{60x125}{37.5}$
= 200 min.
Night time left = (600-200) = 400 min

In 60 minute mixed cluster can be laid = 50 min
In 400 minute mixed cluster can be laid = $\frac{50x400}{60}$
= 333.33
≅ 333 Nos
So total cluster left for outer strip = {500- (125+333)
= 42 Nos

(5) (D+1) Night. Total night time available = 10 hour = 600 min

50 mixed cluster can be laid in 60 min.

So, 42 mixed cluster can be laid in 60 min = $\frac{60x42}{50}$ = 50.40
≅ 51 min.
Night time left = (600-51) = 549 min.

For 3rd Strip.

Number of Anti-tank cluster = 500.
100 Anti-tank cluster can be laid in 60 min.
So, 500 Anti-tank cluster can be laid in = $\frac{60x500}{100}$ = 300.
Night time left = (549-300) = 249 min.

For 2nd Strip

Number of Anti-tank cluster = 500
In 60 minute Anti-tank cluster can be laid 100 nos.
So, In 249 minute Anti-tank cluster can be laid = $\frac{100x249}{60}$ = 415 nos.
So, Anti-tank cluster left = (500-415) = 85 Nos.

(6) (D+2) Night. Total night time available = 10 hour = 600 min
100 Anti-tank cluster can be laid in 60 min.

So, 85 Anti-tank cluster can be laid in = $\frac{60x85}{100}$ = 51 min

Night time left = (600-51) = 549 min

For Inner Strip

Number of mixed cluster= 500 Nos.
In 60 minute mixed cluster can be laid 50 nos.

So, 549 minute mixed cluster can be laid = $\frac{50x549}{60}$ = 457.5 nos.

≅457 nos.

So, mixed cluster remains = (500- 457) = 43 Nos.

(7) (D+3) Night. Total night time available = 10 hour = 600 min
50 mixed cluster can be laid in 60 min

So, 3 mixed cluster can be laid in = $\frac{60x43}{50}$ = 51.6 min

≅ 52 min

(8) Total Time Requirement. Total time Requirement to lay (1500^{x} minefield) = 3x Full Night + 52 minutes.

= 3 x 10 hour + 52 min.
= 30hour 52 min.
= 30 Pl hour 52 min.
≅ 31 Pl hour.

(9) **Summary.**

(a)	Anti-Tank Mines	2200 nos.
(b)	Anti-Personnel Mines	4400 nos.
(c)	Long Pickets	139 nos.
(d)	Short Pickets	175 nos.
(e)	Barbed wire coil	65 coil.
(f)	Tracing tape	159 rolls.
(g)	Transport	12x 3 ton lorry.
(h)	Time Requirement	30 Platoon hour 52 minute≅ 31 Platoon hour.

2. **Reserve Demolition of DHUPAIL Bridge**. To crater a gap of more than 300', my demolition plan will be:

a, Destroy en side abutment by mine charge.
b. Destroy 2x pier with borehole charge.
c. Destroy 2x span of 100' each.

d. Calculation for Abutment.

(1) Here, with of abutment is 35'. So, diagram of my --- will be, D= 35'.

No of charge	1	2	3	4
D (feet) D $=\frac{1}{n}+D\frac{D}{3}$)	35	$\frac{1}{2}(35+\frac{35}{3})$ = 23.33	$\frac{1}{3}(35+\frac{35}{3})$ =15.56	$\frac{1}{4}(35+\frac{35}{3})$ =11.67
C=$\frac{D3}{50}$ $(Each\ Charge)$	857.5	253.97	75.35	31.78
Total Explosive (lb)	857.5	507.94	226.05	127.12
Disposition from face $\frac{D}{4}-\frac{D}{2}$)	8.75-17.5	5.83-11.67	3.89-7.78	2.92-5.83
Depth of Charge $\frac{3}{2}(\frac{D}{4}+\frac{D}{2})$	13.12-26.25	8.75-17.5	5.83-11.67	4.38-8.75
Spacing of Change $\frac{2D}{3}$ (feet)	-	15.55	10.37	7.78

(Auth: GSTP 1603 Section 31, Para 5)

For minimum Explosive, I will go for 4 crater.
(2) Total Charge Requirement = 127.12 lb
(3) Time Requirement.
For 3 craters time Requirement 2 section hours.
So, 4 craters time Requirement$\frac{2x4}{3}$ = 2.67 section hour
So, Platoon hour is = $\frac{2.67}{4}$ = 0.67 platoon hour ≅ 1 platoon hour
(Auth: ERPB 1964, Chapter IV, serial 10, page 146)

e. Calculation for Pier.
Here, thickness of pier is 6'.
Cutting power of hayrick is 2'.

(Auth: GSTP 0003, Section 21, Para 7)

So, I can't destroy it by hayrick. Therefore, I will use borehole charge.

(1) Given Data.
(a) No of pier = 3 Reinforced Cement Concrete.
(b) Width of pier = 25'

(c) Thickness = 6'.

(2) Charge Requirement.

(a) Depth of hole is $\frac{2T}{3}$, T is thickness.

(b) Holes will be at 3 apart.

(c) 3 rows on each side of pier, corresponding in level or opposite side, but with holes staggered.

(d) Diagram of each hole 2" (using auger).

(e) Charge per hole $2\frac{1}{2}$ oz per inch length.

(f) Every hole is half filled.

(Auth: GSTP 0003 Table 19, Notes, Page 52-53).

(g) Number of holes in one row = $\frac{25'}{3'}$ = 8 Nos.

As there will be 3 rows of hole and they will be staggered

Total number of holes = 8+7+8 = 23 Nos.

(h) Depth of holes. Depth of holes = $\frac{2T}{3}$feet.

= $\frac{2x6}{3}$feet.

= 4 feet.

= 48 inches.

(j) Explosive will be filled = $\frac{1}{2}$ x 48" = 24".

So, for 24" length, Explosive Requirement = 24x 2.5 03

= 60 03

In one pier, amount of charge = 23x60 03.

= 1380 03.

For two pier, amount of charge = 1380x2 03

= 2760 03

= $\frac{2760}{16}$ Ib [1 Ib = 1603]

= 172.5 Ib

(3) Time Requirement.

For rapidity, I will use pneumatic tools for drilling hole

For 2" diagram, 1 feet hole needs 7 minute.

So, 4 feet hole needs 7x4 = 28 minute.

Two holes is cratered by two pneumatic tools (Drilling ----)

(Auth: ERPB 1964, Section 26, Note (i) and serial 5)

Using one drill, Time Requirement 46x 28 minute = 1288 minute

Using Two drill, Time Requirement = $\frac{1288}{2}$ 644 minute = 10 hour 44 minute

So, Total time Requirement = 10 hour 44 minute.

(4) Stores.

(a) Primer = 46x2 = 92.
(b) Detonator no 33 = 46.
(c) Pneumatic tools = 2.
(d) Detonating cord = 200'.

f. Calculation for Span**.**

(1) Here, Rd way slab thickness = 9".
No of girders = 5
Width of girders = 2'
Height of girders = 5' + 9" = 5'-8" = 5.75'.
So, H= 5.75' and T= 2'
For one girder charge require = $4\ H^2\ T$
$= 4 \times (5.75)^2 \times 2$
= 264.5 Ib.

(Auth: GSTP-1603, Section 29, Para 2)

For five girder, total charge Requirement = 5x 264.5 Ib
= 1322.5 Ib
Again, For two spans, total charge = 2x 1322.5 Ib
= 2645 Ib.

Additional effect can be obtained by an air cone, in the center of the charge. Using air cone, I can also minimize the amount of charge (Reduced by $\frac{1}{3}$ = 881.67 Ib.

(Auth: GSTP-1603, Section 29, Para 5)

(2) Time Requirement**.** For single cut in a span of 100' length on 30' width; total time requirement = 2 Section require 6 hour.

For 1 Span 12 Section hour require.

(Auth: ERPB 1964, Section 27 Table 1, Serial 16, Page 149)

So, For 2 span 24 section hour Require

So, Total time Requirement = $\frac{24}{4}$= 6 Platoon hour.

(3) Store.

(a) Sand bags = 500
(b) Rope = 200'
(c) Detonating Cord = 200'

(d) Detonating = 10

g. Summary.

(1) Total Time Requirement. 1 hour + 10 hour 44 minute +6 = 17 hour ≅ 18 Platoon hour

(2) Explosive Requirement. (127.12+172.5+881.67) Ib = 1181.29 ≅ 1182 Ib

(3) Stores.

(a)	Primer	= 92 nos.
(b)	Detonating number 33	= 56 nos.
(c)	Electric Cable	= 400'
(d)	Detonating Cord	= 500'
(e)	Sand bags	= 500'
(f)	Rope	= 200'
(g)	Pneumatic tools	= 2

3. Wire Obstacle W1- Cat wire Fence Type-2, 1000^{x}. For unforeseen sit I will consider, laying of wire obstacle will be in dark night.

(a) Time Requirement.

100^{x}catwire fence fype-2 can be laid in 100 minute.
So, 1000^{X}catwire fence fype-2 can be laid in 1000 minute.
= 1000 section minute.
= 250 Pl minute.
= 4.16 Pl hour.
≅ 4 Pl hour 30 minute.

(Auth: GSTP-1603, Page 176, Appendix P)

(b) **Store**.

Serial	Store Item	Store for 100^{x}	Store for 1000^{x}	Res 10%	Total	Remarks
1.	Concertina Coil	24	240	24	264	
2.	Barbed wire Coil	9	90	9	99	
3.	Long Pickets (6')	96	960	96	1056	
4.	Tracing tape Roll	1	10	1	11	
5.	Wire Cutter	1	4	1	5	Per Section One
6.	Windlassing	1	4	1	5	,,

	Sticks					

(Auth: GSTP-0004, Page 150, Appendix M)

Hasty Calculation

4. Minefield Factors.

(a) Anti-Tank Mines. Factor = $\frac{2200}{1500}$ = 1.47

(b) Anti-Personnel Mines. Factor = $\frac{4400}{1500}$ = 2.93

(c) Long Picket. Factor = $\frac{139}{1500}$ = 0.093

(d) Short Picket. Factor = $\frac{175}{1500}$ = 0.117

(e) Barbed Wire Coil. Factor = $\frac{65}{1500}$ = 0.043

(f) Perimeter Sign Post. Factor = $\frac{110}{1500}$ = 0.073

(g) Tracing Tape. Factor = $\frac{159}{1500}$ = 0.106

(h) Time. Factor = $\frac{31}{1500}$ = 0.0207

(Auth: Detail Calculation of Defensive Minefield D1 of 1500^X)

5. Defensive Minefield D1, 4000^X.

(a) Anti-Tank Mines. 4000 x 1.47 = 5880 nos
(b) Anti Personnel Mines. 4000 x 2.93 = 11720 nos
(c) Long Picket. 4000 x 0.093 = 372 nos
(d) Short Picket. 4000 x 0.117 = 468 nos
(e) Barbed Wire Coil. 4000 x 0.043 = 172 nos
(f) Perimeter Sign Post. 4000 x 0.073 = 292 nos
(g) Tracing Tape. 4000 x 0.106 = 424 roll
(h) Time. 4000 x 0.0207 = 82.8 Pl hour.

5. **Axial Mining (A1 & A2), Each 1500^X at SQUARE 9391 and 9206.**

a. For axial mining there will be single strip laid across the axis at 3^x interval (Assumption). So, Number of cluster= $\frac{1500}{3}$ = 500

So, For each of A1 and A2,

Anti-Tank Mines = 500 nos and Anti-Personnel Mine = 3x500 = 1500 nos
In axial mining there will be no marking, Perimeter sign, barbed wire and pickets.

(Auth: GSTP-1626 Chapter 6)

b. Time Requirement. Per hour 50 cluster can be laid in night.

(Auth: GSTP-1626, Chapter II)

So, Time Requirement $\frac{1500}{50}$ = 30 Platoon hour.

c. For A1 and A2, total time and mines will be doubled. So we get

(1) Anti-Tank Mines. 1000 nos.
(2) Anti-Personnel Mines. 3000 nos.
(3) Time Requirement. 60 Pl hour.

7. Defensive Minefield D2, D3, D4, D5, D6, D7, D8. Using minefield factor of defensive minefield 1500^{X} following calculations can be made :

Serial	Items	D2 2000^{X}	D3 1500^{X}	D4 2000^{X}	D5 2400^{X}	D6 2000^{X}	D7 3000^{X}	D8 2500^{X}
1.	Anti-Tank Mine	2940	2200	2940	3528	2940	4410	3675
2.	Anti-Personnel Mine	5860	4400	5860	7032	5860	8790	7325
3.	Long Picket	186	139	186	223.2 = 224	186	279	233
4.	Short Picket	234	175	234	281	234	351	293
5.	Barbed Wire	86	65	86	104	86	129	108
6.	Perimeter Post	146	110	146	176	146	219	183
7.	Tracing Tape	212	159	212	255	212	318	265
8.	Time (Platoon hour)	41.4	31	41.4	49.68	41.4	62.1	51.75

8. Prelim Demolition DATTAPARA Br. This bridge has 4 span each of 80' and 3 Reinforced Cement Concrete pier. To make gap over 300' my plan is:

a. Destroy 2x Abutment (Masonry)

(1) Charge Requirement. Charge Requirement = 2 x 210 = 420 Ib.
(2) Time Requirement. 2 x 2 section hour = 4 section hour.

(Auth: ERPB Section 27, Table 1, Serial 4)

b. Destroy 3x Pier (Reinforced Cement Concrete).

(1) Charge Requirement. Charge Requirement = 3 x 300 = 900 Ib.
(2) Time Requirement. 3 x 20 section hour = 60 section hour.

(Auth: ERPB Section 27, Table 1, Serial 15)

c. **Total Result**.

(1) Total Charge = (420+900) Ib = 1320 Ib.
(2) Total Time = (4 x 60) section hour = 64 section hour = 16 Platoon hour.

(Auth: ERPB Section 27, Table 1, Serial 15)

9. Prelim Demolition TEBARIA Bridge. Total length of this bridge is 200'. 4 span of each 50'. 3x Masonry pier. So, I have to destroy whole 200'.

a. Destroy 2x Abutment (Masonry).

(1) Charge Requirement. Charge Requirement = 2 x 210 = 420 Ib.
(2) Time Requirement. 2 x 2 section hour = 4 section hour.

(Auth: ERPB Section 27, Table 1, Serial 2)

b. Destroy 3x Pier (Masonry).

(1) Charge Requirement. Charge Requirement = 3 x 225 = 675 Ib.
(2) Time Requirement. 3 x 12 section hour = 36 section hour.

(Auth: ERPB Section 27, Table 1, Serial 2)

c. Result.

(1) Total charge Requirement = (420+675) Ib = 1095 Ib.
(2) Total time Requirement = (4+36) hour = 40 section hour = 10 Platoon hour

10. Road Cratering R1 (500^{x}). Craters will be 80' apart.

a. Number of craters = $\frac{500x3}{80}$ = 18.75 ≅ 19

(Auth: ERPB section 26, Para 2 (b)

There are two craters each at Square 0004 and SQUARE 9206

b. Explosive Requirement = 2x19x70 Ib = 2660 Ib.

(Auth: ERPB section 26, Para 2 (a)

c. Time Requirement.

(1) For Square 0004.

3 craters needs 2 section hour
So, 19 craters needs $\frac{2}{3}$ x 19 = 12.67 section hour

$= \frac{12.67}{4}$sectionhour
= 3.17 Platoon hour

(2) For both the Square, time Requirement = 2x3.17 = 6.34

(Auth: ERPB section 26, Para 2 (c)

d. Road Craters Factors are.

(1) Explosive factor = $\frac{1330}{500}$ = 2.66

(2) Time factor = $\frac{3.17}{500}$ = 0.0063

11. Road Cratering R2, R3, R4, R5 R6**.**

Serial	Road Craters	Explosive (Ib)	Time (Pl hour	Remarks
1.	R2, 200^x	532	1.27	Using Rd Crater Factor (Auth: Calculation of R1 500^x from ERPB Section 26, Para 2)
2.	R3, 200^x	532	1.27	
3.	R4, 400^x	1064	2.54	
4.	R5, 500^x	1330	3.17	
5.	R6, 200^x	532	1.27	

12. Crossing Site Denial X1.

a. Method. Laying of nuisance minefield for 300^x around the Crossing site.

b. Mine Requirement.

(1) Anti-Tank Mines =300 (Assumption)

(2) Anti-Personnel Mines = 3 x 300 = 900 (Assumption)

C. Time Requirement.

50 cluster can be laid in 60 minute
So, 300 cluster can be laid in $\frac{60x300}{50}$ = 360 minute = 6 Pl hour

(Auth: GSTP-1626, Chapter II)

13. Crossing Site Denial X2. Same as X1.

(a) Anti-Tank Mines = 300 nos.

(b) Anti-Personnel Mines = 900 nos.

(c) Time Requirement = 6 Platoon hour.

14. Wire Obstacle, W2, Double Apron Fence 1200^x.

During Ni, 100^x needs 160 section minute
So, 1200^x needs 12x160 = 1920 section minute.
= 32 section hour
= 8 Platoon hour

(Auth: GSTP-0004, Appendix P)

a. Time Requirement. 8 Platoon hour.

b. Store
(1) Long Pickets 12x 40 = 480 Nos.
(2) Short Pickets 12x 82 = 984 Nos.
(3) Barbed Wire 12x 13 = 156 Coil.
(4) Wire Cutter = 4 Nos.
(5) Windlassing Sticks = 11 Nos.

(Auth: GSTP-0004, Appendix M, Page 161)

15. Wire Obstacles, W3, Catwire Fence Type-1, 500^x.
For 500^x total time = 5x 120 section minute = 600 section minute.
= 10 section hour
= 2.5 Platoon hour

(Auth: GSTP-0004, Appendix P, Serial 11)

a. Time Requirement. 2.5 Platoon hour.

b. Store
(1) Concertina 12x5 = 60 Coil
(2) Barbed Wire 5x 6 = 30 Coil.
(3) Long Pickets 64x 5 = 320 Nos.
(4) Tracing tape, wire cutter, windlassing sticks = 5

(Auth: GSTP-0004, Page 150)

16. Brigade Water Point.

a. Time Requirement. 3 Platoon hour (Assumption).
b. Store.
(1) Water purification set-1
(2) Pump mark3 - 1.

17. Nuisance Mining.

a. Anti-Tank Mines = 500
b. Anti-Personnel Mine = 1500
c. Time Requirement. 10 Platoon hour

(Auth: GSTP-1626, Chapter II and previous calculation of Xing Site Denial)

18. Anti-tank Ditch 2000[x].

Using size ii/iv Dozer with 100' half way hauling.
Output is 55 cubic yard /hour
(Auth: GSTP-1608Figure 50 page 184)

Now, the width of tank ditch = 14.5 feet
= 4.83 yards
The height of tank ditch = 5' = $\frac{5}{3}$ yds
So, volume = 200[x]$\frac{5}{3}$ x 4.83 cayds
= 16, 100 yards
Time Requirement for 1 Dozer $\frac{16100}{55}$hour = 292.73 hour
1x Plant Platoon has 4x Dozer (2x Size-II, 2x Size IV)
So, Total time = $\frac{292.73}{4}$ Pl hour = 73.18 Platoon hour

19. 100 feet Pontoon Bridge. For laying 100' pontoon bridge we Requirement 1x Platoon they can lay it in 1 platoon hour.

(Auth: HPB-74, Table-2)

ANNEX D TO
ENGINEER PROJECT
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WORK PARTY TABLE

Serial	Task Force	Strength	Unit to Provide	Task
(a)	(b)	(c)	(d)	(e)
1.	Task Force -A	1xPlatoon	XXX Field Company	a. D1 4000[x] at HABIATPUR
				b. D4 2000[x] (Square 9199, 9298)
				c. A1 1500[x] (Square 9206)
				d. Prelim Demolition-1, DATTAPARA Br.
				e. R1 1500[x] each at(SQUARE 0004 and SQUARE 9206)
				f. R3 200[x] (Square 9692)
				g. W1 1000[x] (Square 9506, 9606)
				h. 100 feet Pontoon Bridge at BAGHATIPARA
2.	Task Force -B	1xPlatoon	XXX Field Company	a. D5 2400[x] (Square 8494)
				b. D3 1500[x] (Square 9794)
				c. D2 2000[x] (Square 9604)
				d. A2 1500[x] (Square 9391)
				e. Prelim Demolition-2, TEBARIA Br)

				f.	R2 200^{x} (Square 9605)
				g.	R4 400^{x} (Square 9203, 9204)
				h.	R5 500^{x} (Square 8301, 8302)
				j.	R6 200^{x} (Square 8287, 8288)
				K.	W2 1200^{x}
				l.	Brigade WP DASURIA
3.	Task Force –C	1XPlatoon	XXX Field Company	a.	D6 (SQUARE 8406)
				b.	D7 (Square 8297)
				c.	D8 (Square 8292)
				d.	Naissance Minefd, DAYRAMPUR
				e.	Reserve Demolition at DHUPAIL Bridge
				f.	X1
				g.	X2 (Square 9191)
				h.	W3 (Square9205, 9304)
4.	Task Force-D	1XPlatoon	XXX Field Company	Atk ditch 2000^{x} (Square 8102, 8103)	

ANNEX E TO ENGINEER
PROJECT
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STORE LIST

Serial	Items	Account unit	Requirement			Remarks
			Actual	10% Reserve	Total	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1.	Anti Tank Mines	Nos	28578	2854.8	31402	
2.	Anti Personnel Mines	,,	55712	5571.2	61283	
3.	Long Picket	,,	2152	175	1882	
4.	Short Picket	,,	1050	215.2	2368	
5.	Barbed Wire Coil	,,	1343	105	1165	
6.	Perimeter Sign Post	,,	380	134	1477	
7.	Tracing Tape	Roll	10247	38	418	
8.	Plastic Explosive	Ib	2125	1024.7	11272	
9.	Detonating Cord	Nos	1125	213	2338	
10.	Primer	,,	575	113	1238	
11.	Detonator (Elec)	,,	580	58	633	
12.	Detonator (Non elec)	,,	10	58	638	
13.	Compass	,,	20	5	15	
14.	Sledge hammer	,,	50	8	28	
15.	Shovel	,,	10	20	70	
16.	Camouflage Set	,,	35	5	15	
17.	Wire Cutter	,,	1584	5	40	
18.	Sand Bag	,,	50	158	1742	
19.	Windlassing Stick	,,	20	5	55	
20.	Blasting Machine	,,	300	2	22	
21.	Ropes	Yds	20	30	530	
22.	Nails	Kg	50	2	22	
23.	Wooden Plank	Nos	100	5	55	
24.	Hand gloves	Pairs		10	110	

ANNEX F TO
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TRANSPORT SCHEDULE

Serial	Vehicle	Quantity	Store	From		To		Remarks
				RV	Time	RV	Time	
1.	3 ton Pickup	4 2	Manpower, Mines, Barbed wire, Pickets for Task Force-A	DANGAPARA	151900 Jul 2013	LALPUR	152000 Jul 2013	
2.	3 ton Pickup	4 2	Manpower, Mines, Barbed wire, Pickets for Task Force-B	DANGAPARA	151900 Jul 2013	BAGATIPARA	152000 Jul 2013	
3.	3 ton Pickup Jeep	3 2 1	Manpower, Mines, Barbed wire, Pickets for Task Force-C	DANGAPARA	151900 Jul 2013	KANCHUTIA	152100 Jul 2013	
4.	Pickup Jeep	1 1	Manpower, Store, Petroleum, Oil and Lubricants for Plant (Task Force-D)	DANGAPARA	151900 Jul 2013	IBRAHIMPUR	152300 Jul 2013	
5.	Pickup Jeep	4 1	Manpower, Demolition stores. Road crater, wire obstacle for Task Force-A	DANGAPARA	152200 Jul 2013	LALPUR	152300 Jul 2013	
6.	3 ton Pickup	4 2	Manpower, Demolition stores, Road crater, wire obstacle, Brigade Water Point stores for Task Force-B	DANGAPARA	152200 Jul 2013	BAGATIPARA	152300 Jul 2013	
7.	3 ton Pickup	3 2	Manpower, Store for Demolition, wire obstacle, road crater, crossing sites for Task Force-C	DANGAPARA	152300 Jul 2013	KANCHUTIA	150000 Jul 2013	

ANNEX G TO
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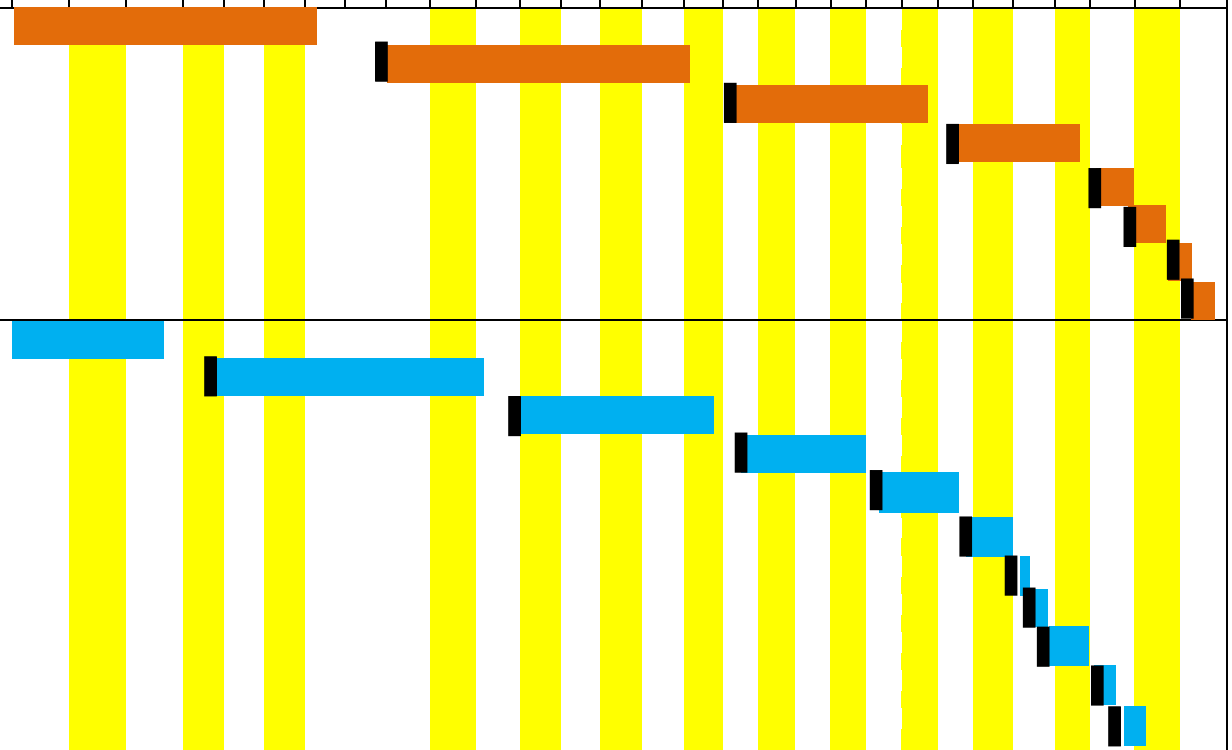
JOB PRIORITY LIST

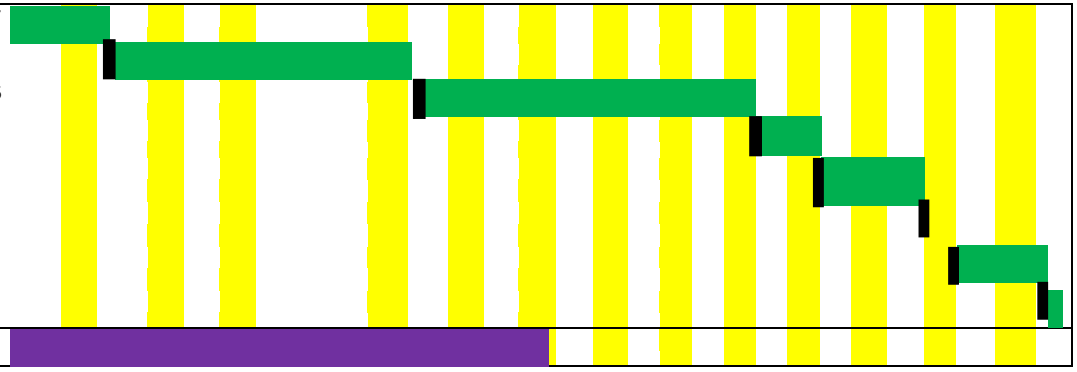
Serial	Job	Priority	Composition	Time Requirement
1.	D1 (2000^{X})	1	TASK FORCE-A	41.4 Pl hour
2.	D4	2		41.4
3.	A1	3		30
4.	Prelim Demolition-1	4		16
5.	R1	5		6.34
6.	R3	6		1.27
7.	W1	7		4.5
8.	100 feet Pontoon Bridge	8		1
9.	D5 (1200^{X})	1	TASK FORCE-B	24.84
10.	D3	2		31
11.	D2 (1000^{X})	3		20.7
12.	A2	4		30
13.	Prelim Demolition-2	5		10
14.	R2	6		1.27
15.	R4	7		2.54
16.	R5	8		3.17
17.	R6	9		1.27
18.	W2	10		8.0
19.	Brigade WP	11		3
20.	D6 (1000^{X})	1	TASK FORCE-C	20.7
21.	D7 (1500^{X})	2		31.05
22.	D8	3		51.75
23.	Nuisance Mining	4		10
24.	Res Demolition	5		18
25.	X1	6		6
26.	X2	7		6
27.	W3	8		2.5
28.	Atk	1	TASK FORCE-D	73.18

Note: Defensive Minefield's (D1, D2, D5, D6, D7) frontage will be reduced for accomplishing the task by 30 0500 Jul 2013.

Ser	Task	TASK FORCE	Pri	Pl ltr
1.	Def Minefd D1	A	1	41.4
2.	Def Minefd D4		2	41.4
3.	Arial Minefd A1		3	30
4.	Prelim Demolition-1 of DATTAPARA Br		4	16
5.	Rd Cratering R1		5	6.34
6.	Rd Cratering R3		6	1.27
7.	Wire obs W1		7	4.5
8.	100 ft pontoon Br		8	1
9.	Def Minefd D5	B	1	24.84
10.	Def Minefd D3		2	31
11.	Def Minefd D2		3	207
12.	Arial Minefd A2		4	30
13.	Rerlim Demolition-2 of TEBARIA Br		5	10
14.	Rd Cratering R2		6	1.27
15.	Rd Cratering R4		7	2.54
16.	Rd Cratering R5		8	3.17
17.	Rd Cratering R6		9	1.27
18.	Wire obs W2		10	8
19.	Brigade WP at DASURIA		11	3



20.	Def Minefd D6		1	20.7	
21.	Def Minefd D7		2	31.05	
22.	Def Minefd D8		3	51.75	
23.	Naissance Minefd		4	10	
24.	Res Demolition of DUPHAL Br	C	5	18	
25.	Xing Site Denial X1		6	6	
26.	Xing site Denial X2		7	6	
27.	Wire obs W3		8	2.5	
28.	Atk	D	1	73.18	



LEGENDS

Ser	Meaning	Symbol
1.	Task force-A	
2.	Task Force-B	
3.	Task Force-C	
4.	Task Force-D	
5.	Day Break	
6.	Transport Time	

ANNEX H TO
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WKS PROG

Ser	Task	TASK FORCE	Pri	Pl ltr	15/16 Jul	Day Blank	16/17 Jul	Day Blank	17/18 Jul	Day Blank	18/19 Jul	Day Blank	19/20 Jul	Day Blank	20/21 Jul	Day Blank	21/22 Jul	Day Blank	22/23 Jul	Day Blank	23/24 Jul	Day Blank	24/25 Jul	Day Blank	25/26 Jul	Day Blank	26/27Jul	Day Blank	27/28Jul	Day Blank	28/29 Jul	Day Blank	29/30 Jul
1.	Def Minefd D1	A	1	41.4																												
2.	Def Minefd D4		2	41.4																												
3.	Arial Minefd A1		3	30																												
4.	Prelim Demolition-1 of DATTAPARA Br		4	16																												
5.	Rd Cratering R1		5	6.34																												
6.	Rd Cratering R3		6	1.27																												
7.	Wire obs W1		7	4.5																												
8.	100 ft pontoon Br		8	1																												
9.	Def Minefd D5	B	1	24.84																												
10.	Def Minefd D3		2	31																												
11.	Def Minefd D2		3	20.7																												
12.	Arial Minefd A2		4	30																												
13.	Rerlim Demolition-2 of TEBARIA Br		5	10																												
14.	Rd Cratering R2		6	1.27																												
15.	Rd Cratering R4		7	2.54																												
16.	Rd Cratering R5		8	3.17																												
17.	Rd Cratering R6		9	1.27																												
18.	Wire obs W2		10	8																												
19.	Brigade WP at DASURIA		11	3																												
20.	Def Minefd D6	C	1	20.7																												
21.	Def Minefd D7		2	31.05																												
22.	Def Minefd D8		3	51.75																												
23.	Naissance Minefd		4	10																												
24.	Res Demolition of DUPHAL Br		5	18																												
25.	Xing Site Denial X1		6	6																												
26.	Xing site Denial X2		7	6																												
27.	Wire obs W3		8	2.5																												
28.	Atk		1	73.18																												

LEGENDS

Ser	Meaning	Symbol
1.	Task force-A	
2.	Task Force-B	
3.	Task Force-C	
4.	Task Force-D	
5.	Day Break	
6.	Transport Time	