BIMS GROUP
DELAY ANALYSIS TECHNIQUE

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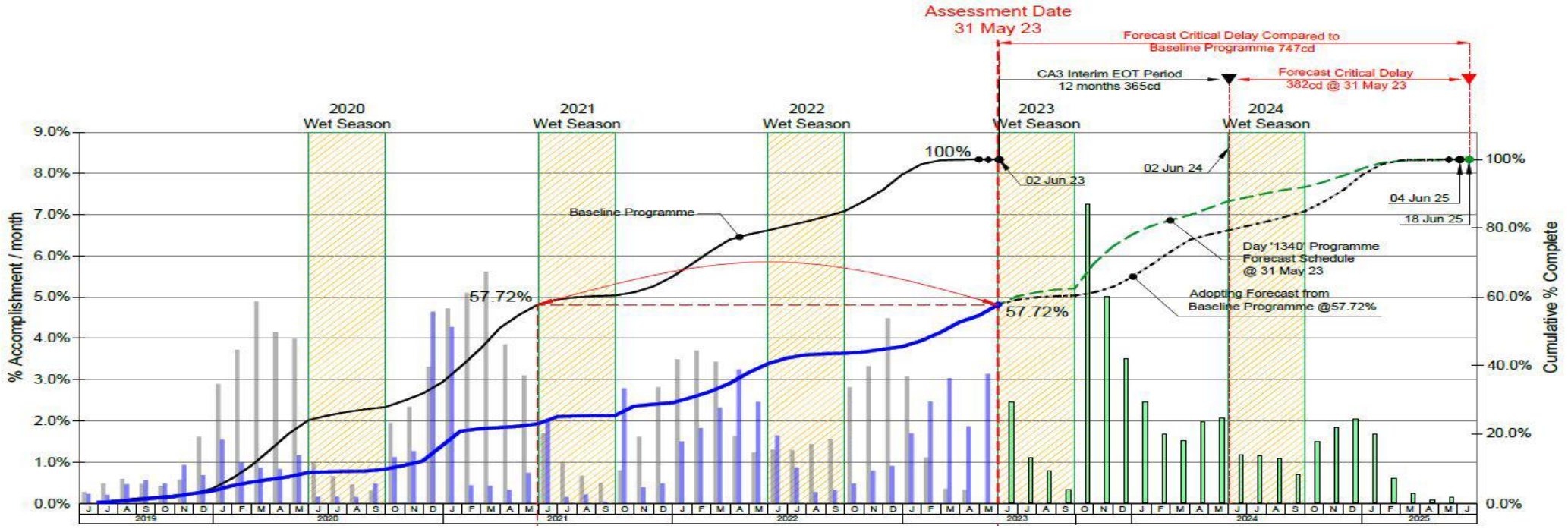
CHEUNG LEE STCHAI WAN, HONG KONG

PROJECT TITTLE : Yangon-Mandalay Railway Improvement Project Phase-1 CP101
SUBJECT : **MONTHLY PROGRESS STATUS SUMMARY REPORT**
PERIOD ENDING : 02-June-2023

APPENDIX A

Section Name	Particular	Contract Completion Date	Interim EoT (Based on CA3)	Revised Time for Completion (Based on CA3)	Current Forecast Early Completion Date	Current Remaining Forecast Delay after CA3 (in Days)	Current Total Delay against Original Contract (in Days)	Overall Construction Progress (Based on Duration)		
								Previous	This Month	Current
1.1	Pazundaung (Excl.) / Ywatagyi (Incl.)	02-Jun-23	12 Months	02-Jun-24	18-Jun-25	(382)	(747)	13.09%	3.07%	16.16%
1.2	Ywatagyi (Excl.) / Tongyi (Incl.)	02-Nov-21	30 Months	02-Jun-24	26-Mar-24	67	(876)	77.73%	3.10%	80.83%
1.3	Tongyi (Excl.) / Bago (Incl.)	02-Sep-21	33 Months	02-Jun-24	26-Feb-24	96	(908)	81.45%	2.78%	84.23%
	Bridge No. 50 Completion	02-Jun-23	12 Months	02-Jun-24	22-Nov-23	192	(174)	81.82%	8.19%	90.01%
	Bridge No. 58 Completion	02-Jun-23	12 Months	02-Jun-24	05-Dec-23	179	(187)	83.16%	7.62%	90.78%
	Bridge No. 32 Completion	02-Jun-23	12 Months	02-Jun-24	23-Jul-24	(52)	(418)	42.50%	4.02%	46.52%
	Bridge No. 33 Completion	02-Jun-23	12 Months	02-Jun-24	24-May-24	8	(358)	44.90%	5.50%	50.40%
OVERALL CONSTRUCTION PROGRESS		**02-Jun-23**	**12 Months**	**02-Jun-24**	**18-Jun-25**	**(382)**	**(747)**	**54.59%**	**3.13%**	**57.72%**

NOTE:
1. Revised Time for Completion in accordance with Contract: CP/101/MR(ML)/2018 dated 29 April 2022
2. The Data Date is 02-June-23
3. Additional future impact for Covid -19 pandemic, State of Emergency and other unforeseen circumstances and variations are not included
4. Progress is based on Day 1340 Updated Baseline Programme

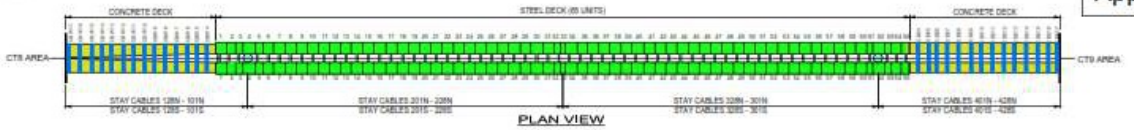


Appendix 20.4

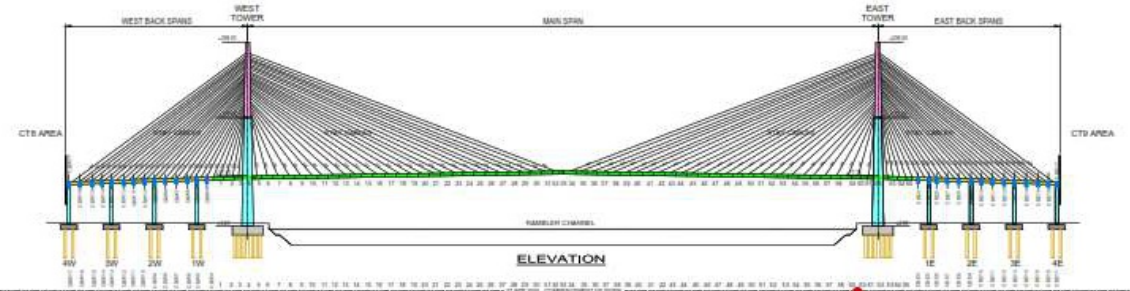
Contract No. HY/2002/26 - STONECUTTERS BRIDGE

TIME LOCATION CHART

BACKSPAN CRITICAL DELAY ASSESSMENT



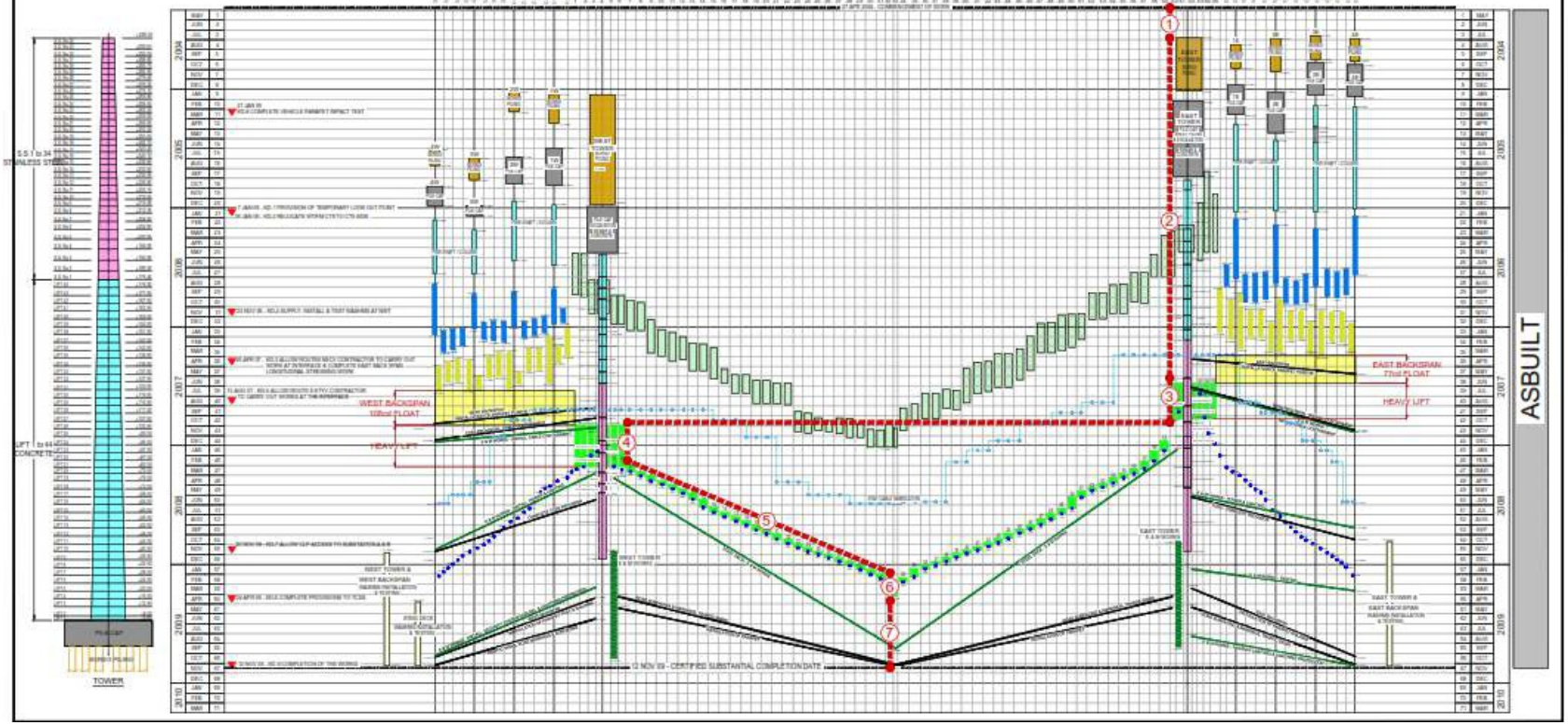
PLAN VIEW



ELEVATION

KEY:

- BORED PILE
- PILE CAP
- WEST & EAST TOWER
- PIER SHAFT / COLUMN
- PIER HEAD
- REINFORCED CONCRETE DECK
- STEEL SEGMENTS FABRICATION
- STEEL SEGMENTS INSTALLATION
- WASHING INSTALLATION
- STAY CABLE FABRICATION
- STAY CABLES INSTALLATION
- CRASH BARRIERS & PARAPET
- SURFACING, ROAD MARKINGS, TRAFFIC SIGN & LIGHTING
- MEP WORKS
- TCSS PROVISION
- CRITICAL PATH

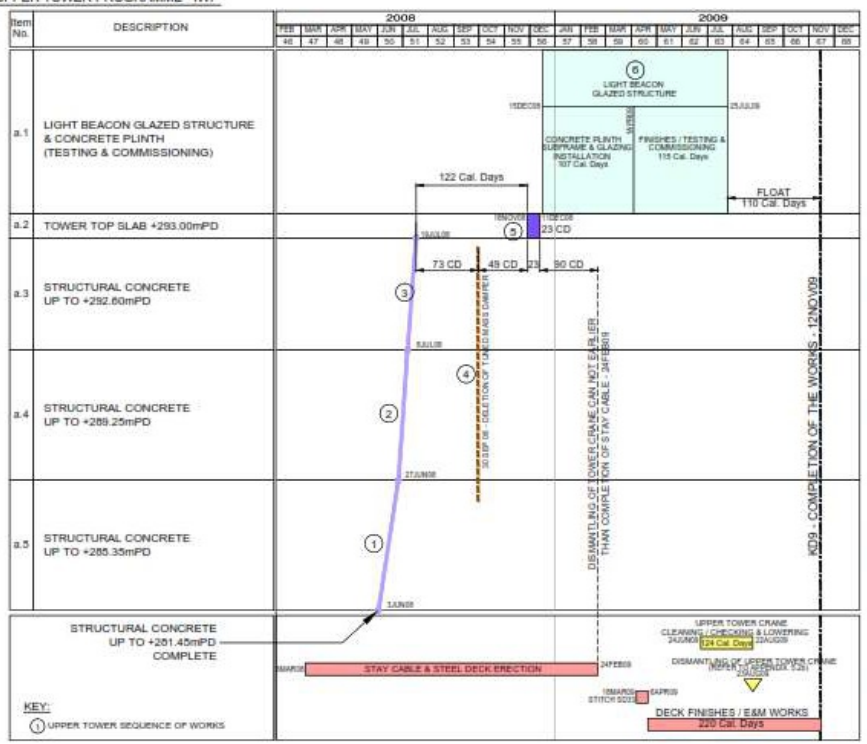


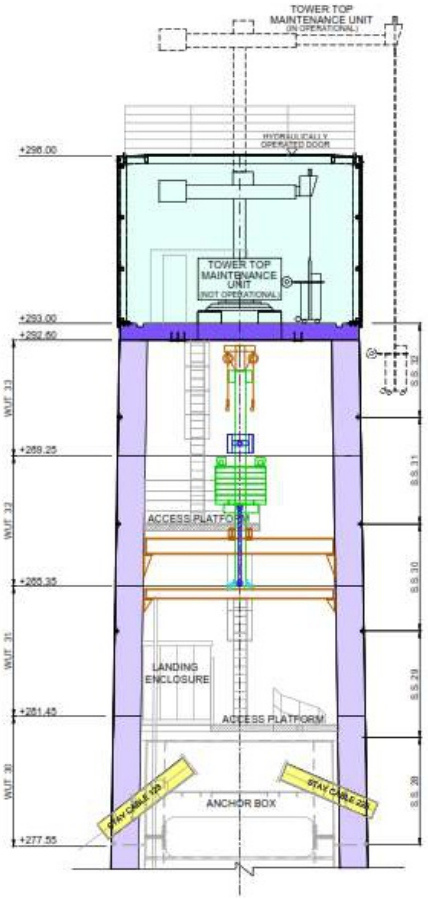
Contract No. HY/2002/26 - STONECUTTERS BRIDGE

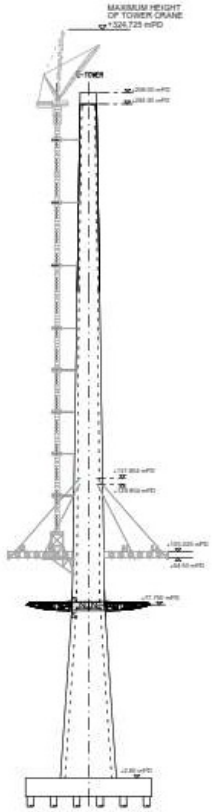
WEST TOWER - TUNED MASS DAMPER PROGRAMME ASSESSMENT

Appendix 20.10b

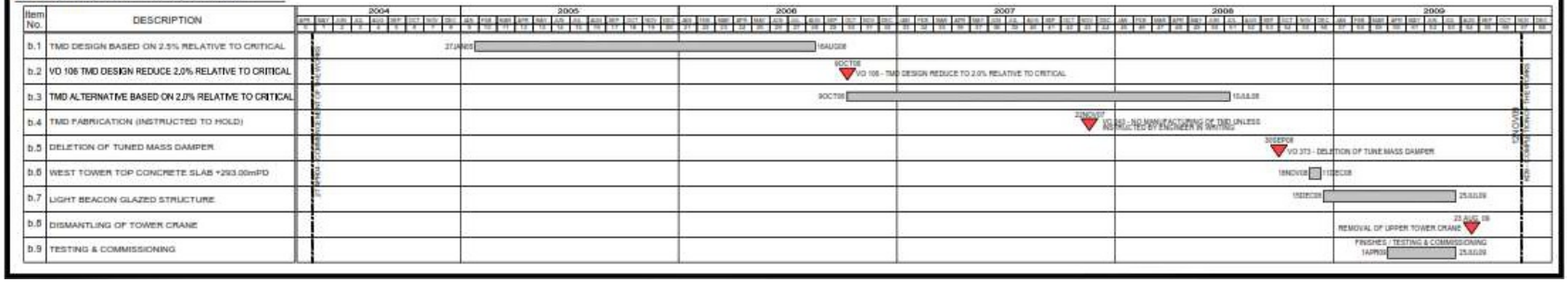
A. UPPER TOWER PROGRAMME - IWP







B. TUNED MASS DAMPER PROGRAMME

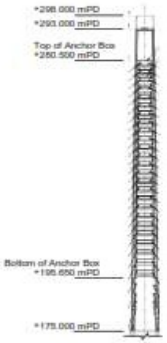


Contract No. HY/2002/26 - STONECUTTERS BRIDGE

EAST TOWER CRANEAGE UTILIZATION - IWP v ACTUAL

5.1b Upper East Tower Crane

APPENDIX 5.1b



ERECTION OF UPPER TOWER CRANE INPROGRESS

JAN 2007

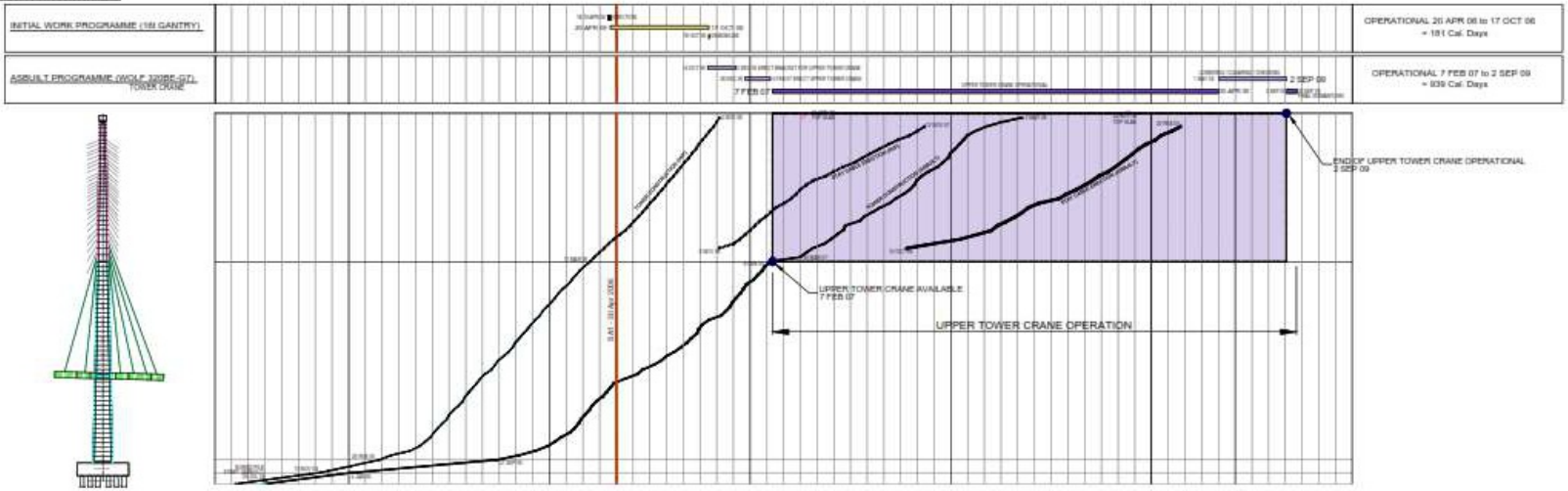
UPPER TOWER CRANE OPERATIONAL

DEC 2007

DISMANTLING OF UPPER TOWER CRANE INPROGRESS

SEP 2009

(b) UPPER TOWER CRANE



KEY:

- INITIAL WORK PROGRAMME (IWP)
- ASBUILT
- OPERATION ZONE & DURATION OF CRAWLER CRANE
- OPERATION ZONE & DURATION OF LOWER TOWER CRANE

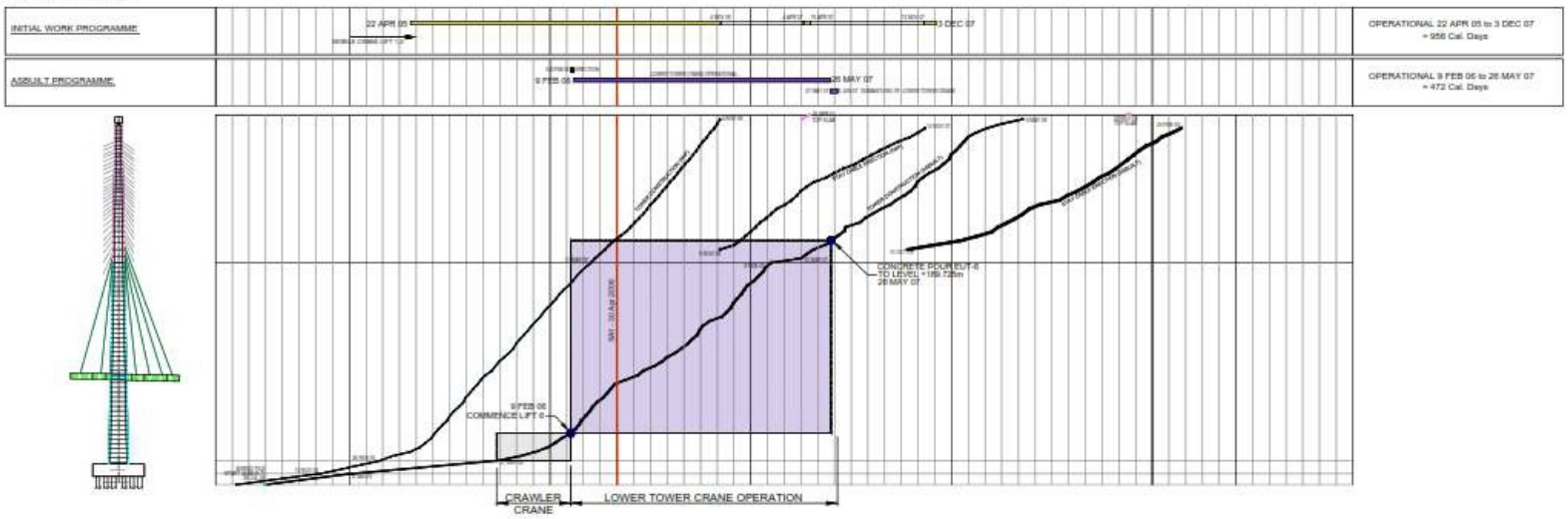
Contract No. HY/2002/26 - STONECUTTERS BRIDGE

EAST TOWER CRANEAGE UTILIZATION - IWP v ACTUAL

5.1a Lower East Tower Crane

APPENDIX 5.1a

(a) LOWER TOWER CRANE



KEY:

- INITIAL WORK PROGRAMME (IWP)
- ASBUILT
- OPERATION ZONE & DURATION OF CRAWLER CRANE
- OPERATION ZONE & DURATION OF LOWER TOWER CRANE

Appendix 20.6a

Contract No. HY/2002/06 - STONECUTTERS BRIDGE

EAST & WEST TOWER - STAY CABLE PROGRAMME ANALYSIS

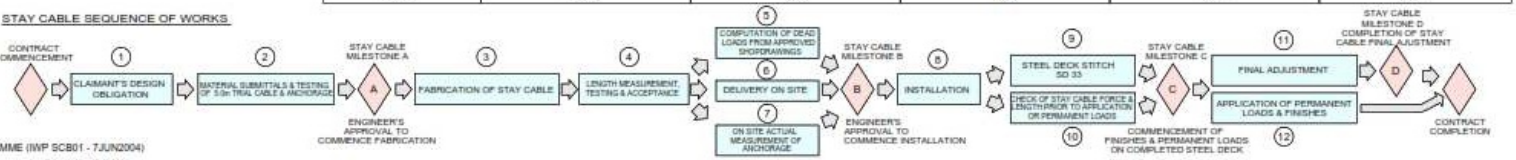
1.INITIAL WORKS PROGRAMME

ITEM No.	DESCRIPTION	START DATE	FINISH DATE	DURATION (Cal. Days) cd
1.1	FABRICATION OF STAY CABLE EAST & WEST SIDE	SCD40612 2JUL05	SCD40612 11NOV08	497
1.2	DELIVERY OF FABRICATED STAY CABLE ON SITE EAST & WEST SIDE	SCD40614 26SEP06	SCD40614 18NOV07	418
1.3	EAST SIDE ASSEMBLY & INSTALLION OF STEEL DECK SD60-65 & CROSS BEAMS	5 DEC 05	26 JUN 06	203
1.4	STAY CABLE ERECTION EAST SIDE (301-328 / 401-428)	SCD40168 8NOV06	SCD40168 12NOV07	371
1.5	WEST SIDE ASSEMBLY & INSTALLION OF STEEL DECK SD1-6 & CROSS BEAMS	19 MAY 06	25 SEP 06	129
1.6	STAY CABLE ERECTION WEST SIDE (101-128 / 201-228)	SCD40179 26SEP06	SCD40226 17NOV07	417
1.7	STITCH DECK SD33	SCD40228 18NOV07	SCD40228 3DEC07	15
1.8	STEEL DECK FINISHES	4DEC07	28JUN07	205
1.9	STAY CABLE FINAL ADJUSTMENT	4DEC07	28JUN07	205
1.10	PLANNED STAY CABLE MILESTONES			
SCMS-A	ENGINEER'S APPROVAL TO COMMENCE FABRICATION	27APR04	2JUL05	430
SCMS-B	ENGINEER'S APPROVAL TO COMMENCE INSTALLATION	3JUL05	8NOV06	492
SCMS-C	COMMENCEMENT OF FINISHES & PERMANENT LOADS ON COMPLETED STEEL DECK	7NOV06	18NOV07	378
SCMS-D	COMPLETION OF STAY CABLE FINAL ADJUSTMENT	18NOV08	28JUN08	220

2. ASBUILT PROGRAMME

2.1	FABRICATION OF STAY CABLE EAST & WEST SIDE	SCD44131 2DEC06	SCD44463 29AUG08	636
2.2	DELIVERY OF FABRICATED STAY CABLE ON SITE EAST & WEST SIDE	SCD44145 23JUL07	SCD44309 21DEC08	517
2.3	EAST SIDE HEAVY LIFT ASSEMBLY & INSTALLATION STEEL DECK SD60-65 & CROSS BEAMS	22 JAN 07	4 SEP 07	225
2.4	STAY CABLE ERECTION EAST SIDE (301-328 / 401-428)	SCD44590 12SEP07	SCD44850 20FEB09	527
2.5	WEST SIDE HEAVY LIFT ASSEMBLY & INSTALLATION STEEL DECK SD1-6 & CROSS BEAMS	27 SEP 07	1 JAN 08	96
2.6	STAY CABLE ERECTION WEST SIDE (101-128 / 201-228)	SCD44990 2JAN08	SCD45250 24FEB09	419
2.7	STITCH DECK SD33	25FEB09	SCD45260 6APR09	40
2.8	STEEL DECK FINISHES	7APR09	9OCT09	185
2.9	STAY CABLE FINAL ADJUSTMENT	7APR09	9OCT09	185
2.10	ASBUILT STAY CABLE MILESTONES			
SCMS-A	ENGINEER'S APPROVAL TO COMMENCE FABRICATION	27APR04	2FEB07	1,010
SCMS-B	ENGINEER'S APPROVAL TO COMMENCE INSTALLATION	3FEB07	11SEP07	220
SCMS-C	COMMENCEMENT OF FINISHES & PERMANENT LOADS ON COMPLETED STEEL DECK	12SEP07	7APR09	572
SCMS-D	COMPLETION OF STAY CABLE FINAL ADJUSTMENT	8APR08	12NOV09	219

STAY CABLE SEQUENCE OF WORKS



KEY:
INITIAL WORK PROGRAMME (IWP SCB01 - 7JUN2004)
ASBUILT PROGRAMME cd = CALENDAR DAYS

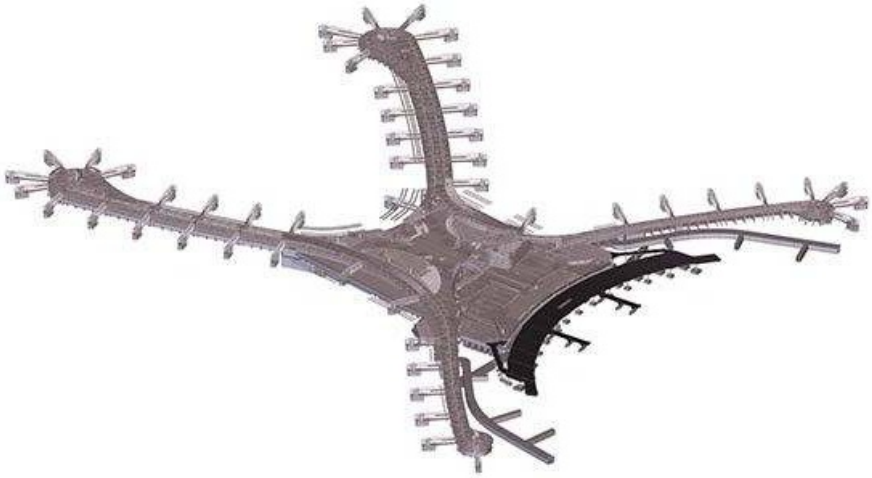
Midfield Terminal Building

Geographic Location: Services	Abu Dhabi, United Arab Emirates Pre- and Post
Rendered:	Contract BIM support Tekla
Software Tools Used: Project Description:	Structures, AutoCAD

BIMS Group was engaged by Murray & Roberts Contractors on the new Abu Dhabi Airport a major project development for the UAE Government.

BIMS Group provided 3D modelling services, construction sequencing, and construction logistics models during the pre-contract stage.

Due to the extensive knowledge of the project available within BIMS Group support has also been provided to the supply chain during the construction stage.

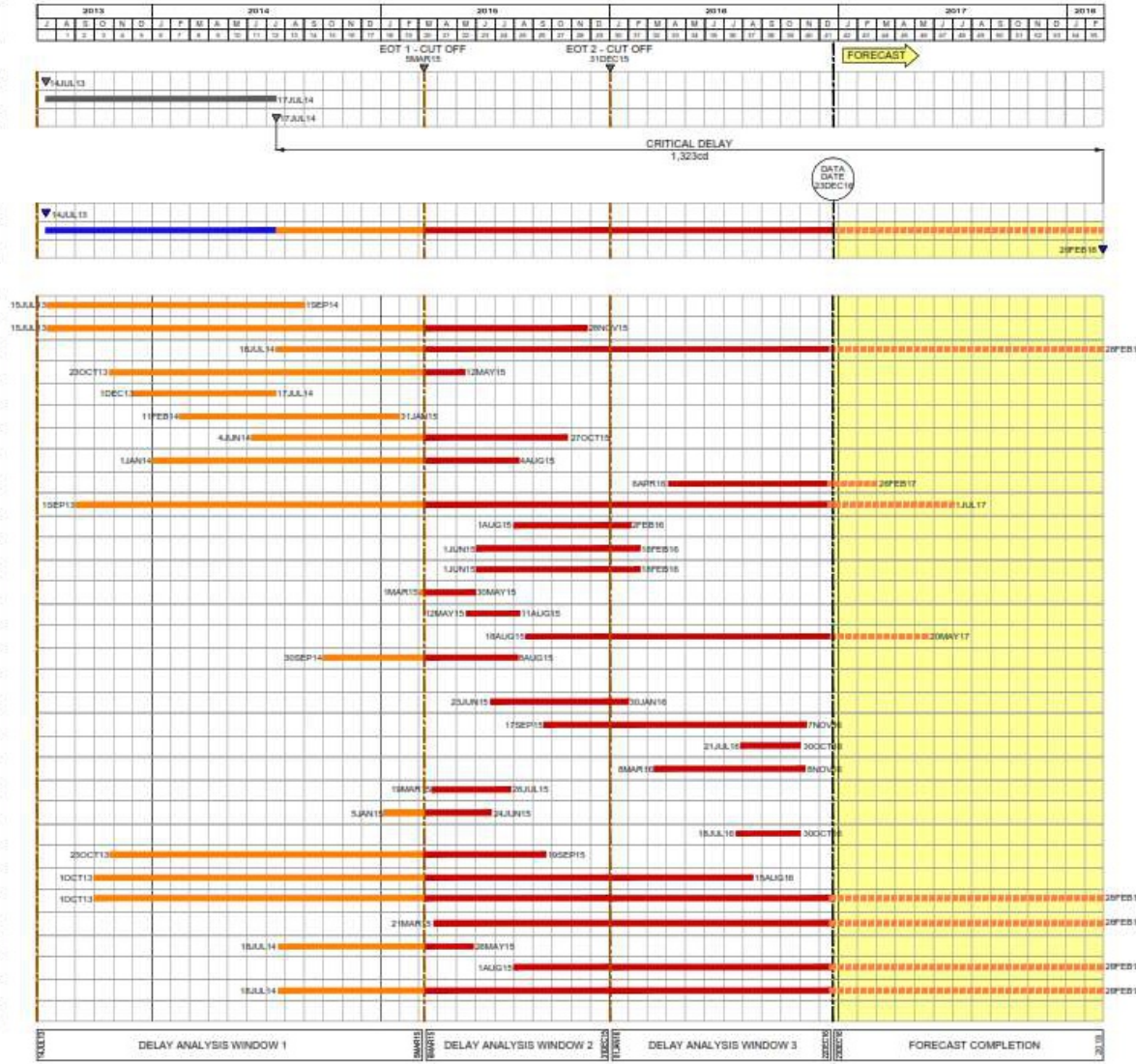


ABU DHABI INTERNATIONAL AIRPORT - MIDFIELD TERMINAL BUILDING

Summary of Delaying Event

Appendix C
Sheet 1 of 3

ITEM	DESCRIPTION	Start Date	Finish Date	Duration Cal.Days (Approximate)
1. PLANNED PROGRAMME				
1.1	Project Commencement	14JUL13		
1.2	Contract Period (304 Working Days)	14JUL13	17JUL14	369
1.3	Contract Completion		17JUL14	
2. ACTUAL PROGRAMME				
2.1	Project Commencement	14JUL13		
2.2	Forecast Contract Period	14JUL13	28FEB18	1,691
2.3	Forecast Contract Completion		28FEB18	
3. KEY DELAYING EVENTS				
3.1	EVENT 1 - DAS & ILSS - EPS Bearing Pads	15JUL13	15SEP14	434
3.2	EVENT 2 - T-Section - POT Bearings	15JUL13	28NOV15	867
3.3	EVENT 3 - DAS - GRC Blast Requirements	16JUL14	28FEB18	1,322
3.4	EVENT 4 - T-Section - Work Progress Delay	23OCT13	12MAY15	567
3.5	EVENT 5 - ILSS Column Design / Construction Delays	1DEC13	17JUL14	229
3.6	EVENT 6 - DAS Column Design / Construction Delays	11FEB14	31JAN15	355
3.7	EVENT 7 - DAS I-Girder and PC Slabs - Production Delays	4JUN14	27OCT15	511
3.8	Event 8 - T-Section - Design Change & Variation	1JAN14	4AUG15	581
3.9	EVENT 9 - T-Section - Additional GRC Works at Void Area	6APR16	28FEB17	327
3.10	EVENT 10 - Footbridge Design / Construction Changes & Delay	15SEP13	1JUL17	1,400
3.11	EVENT 11 - DAS Embedment & Associated Thickening Changes	1AUG15	2FEB16	186
3.12	EVENT 12 - DAS - Re-design of Firefighting System	1JUN15	18FEB16	263
3.13	EVENT 13 - DAS & ILSS - Steel Link Bridge - Design Change	1JUN15	18FEB16	263
3.14	EVENT 14 - DAS Finish Level Change	18MAR15	30MAY15	91
3.15	EVENT 15 - DAS - 4 Edge Piers - Revised Geometry	12MAY15	10AUG15	91
3.16	EVENT 16 - ILSS & T-Section - GRC Design Load Change	16AUG15	20MAY17	642
3.17	EVENT 17 - T-Section - GRC Scallops - Design Change	30SEP14	5AUG15	313
3.18	EVENT 18 - PCB - Revised Load & Geometry Change	COST CLAIM		
3.19	EVENT 19 - DAS Lower Slab & Bracing - Blast Requirement	23JUN15	30JAN16	232
3.20	EVENT 20 - PCB - Suspension of Work	17SEP15	7NOV16	416
3.21	EVENT 21 - CPFB Gantry Bridge Access Requirements	21JUL16	30OCT16	102
3.22	EVENT 22 - PCB - Redesign of Expansion Joint	8MAR16	8NOV16	246
3.23	EVENT 23 - Acceleration Works	18MAR15	26JUL15	130
3.24	EVENT 24 - ILSS - Additional Diaphragms	5JAN15	24JUN15	171
3.25	EVENT 25 - CPFB - Segment 01 - Design Change	18JUL16	30OCT16	105
3.26	EVENT 26 - Miscellaneous Issues	23OCT13	19SEP15	697
3.27	EVENT 27 - Provision of Crannage	1OCT13	15AUG16	1,050
3.28	EVENT 28 - Wrongful Back charges	1OCT13	28FEB18	1,612
3.29	EVENT 29 - E. Construct Claims	21MAR15	28FEB18	1,076
3.30	EVENT 30 - T-Section Variation Works	16JUL14	26MAY15	313
3.31	EVENT 31 - Financial Hardship / Interest	1AUG15	28FEB18	943
3.32	EVENT 32 - Management of Change	16JUL14	28FEB18	1,322



ABU DHABI INTERNATIONAL AIRPORT - MIDFIELD TERMINAL BUILDING

BASELINE TIME LOCATION PROGRAMME

(Rev. 2 - 12 OCT 2014)

Appendix H
22 December 2016

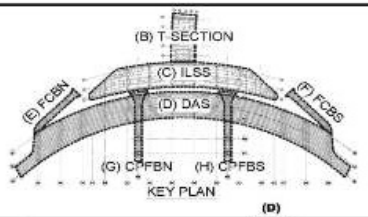


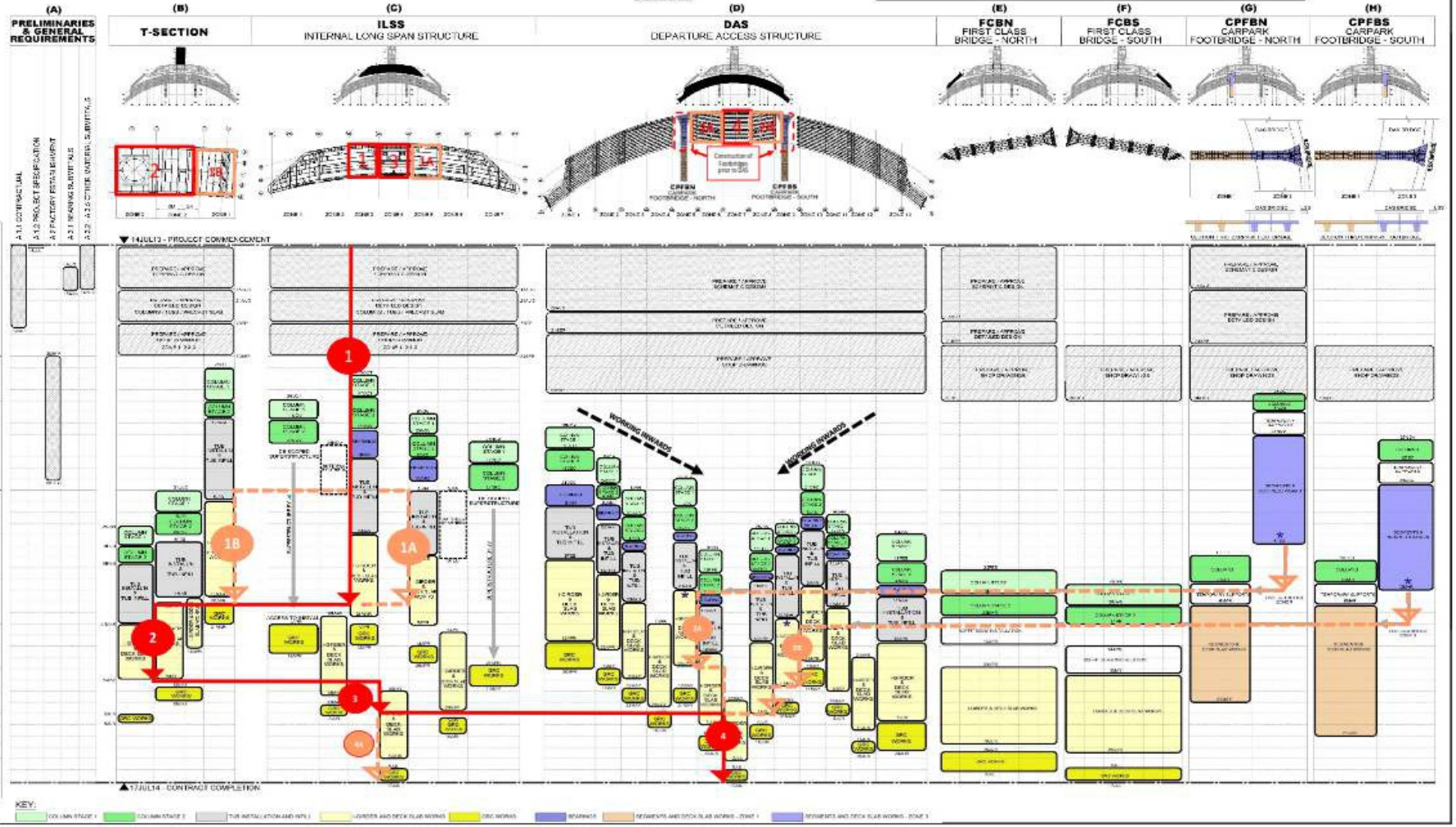
CHART 3

ANNOTATED BASELINE PROGRAMME WITH CRITICAL PATH

Critical Path

Sub-Critical Path

(A) PRELIMINARIES & GENERAL REQUIREMENTS	(B) T-SECTION	(C) ILSS INTERNAL LONG SPAN STRUCTURE	(D) DAS DEPARTURE ACCESS STRUCTURE	(E) FCBN FIRST CLASS BRIDGE - NORTH	(F) FCBS FIRST CLASS BRIDGE - SOUTH	(G) CPFBN CARPARK FOOTBRIDGE - NORTH	(H) CPFBS CARPARK FOOTBRIDGE - SOUTH



WRITE UP FORMAT

EVENT 1 – DAS & ILSS - EPS BEARING PADS

1.1 Basis of EOT and Cost Claim

1 Summary of Sub-Claim

1.1.1.1 In accordance with Appendix E, Clause 4.2.67 of the LOA Agreement, (see Appendix S, page 000019), GPCC was obliged to include within its scope the required bearings for all the bridges.

1.1.1.2 GPCC considered the use of seismic bearings that would accommodate the precast design. The use of special “Friction-Pendulum” bearings was excluded as per item 7 of GPCC offer letter QP-13016R6 date 4 July 2013 (see Appendix 1.4, page 000005 and Appendix T, page 000005) stating;

2 Basis of the Claim

1.1.2.1 Upon award of the Contract, our designer, E-Construct proceeded with the design of the precast bridges. During our meeting with TCAV and the bearing supplier “Alga” on 4 August 2013, E-Construct confirmed that they shall calculate the bearing loads to determine if we shall adopt “friction pendulum” bearing pad or mechanical pad (with spring) as proposed in the last workshop (see Appendix 1.4, page 000012)

1.1.2.2 On 15 September 2013, GPCC formally received the bearing design drawings that noted the bearing geometry and rotation in two directions to be confirmed (see Appendix 1.4, pages 000013 to 000016).

1.1.2.3 On 19 October 2013, GPCC received a quotation for the Friction Pendulum bearings that were assumed 16 times more expensive than GPCC budget (see Appendix 1.4, page 000017).

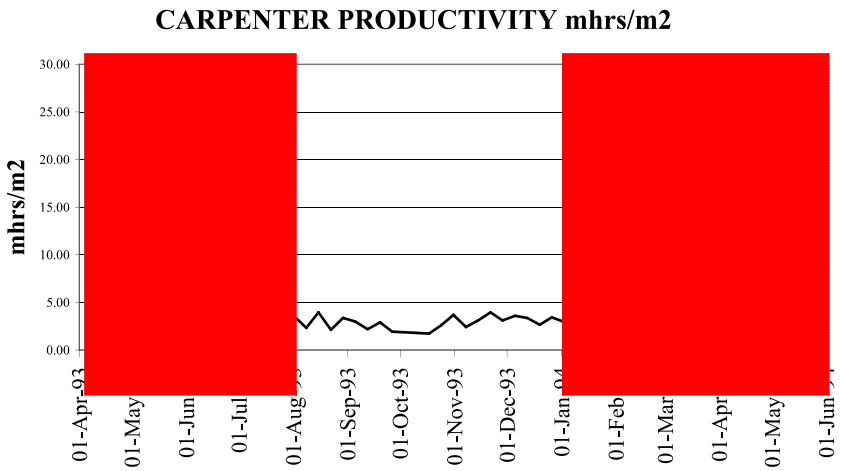
3 Time, Cost and Additional Effect of the Claim

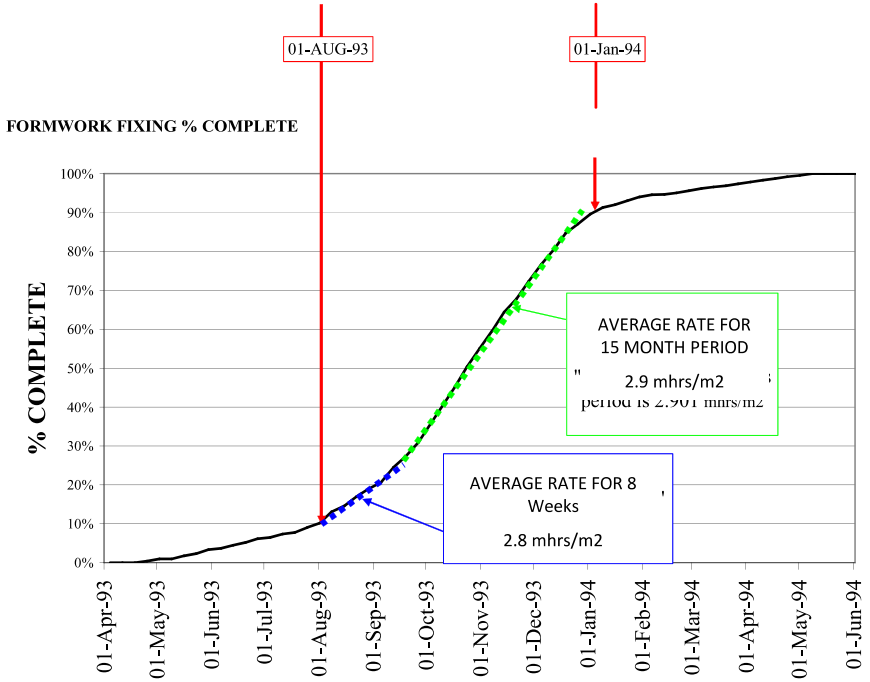
1.1.3.1 Delay in the design and supply of the bearings severely impacted the procurement and necessitated the installation of temporary bearings.

1.1.3.2 Additionally, the construction of the column for Stage 2 construction was severely delayed and impacted the project.

1.1.3.3 We have prepared a Summary Programme and Fragmented Programme as Appendix 1.2 and 1.3 respectively. The total consequence of the issue affected the project by 279 calendar days.

Measured Mile Productivity Delay Assessment





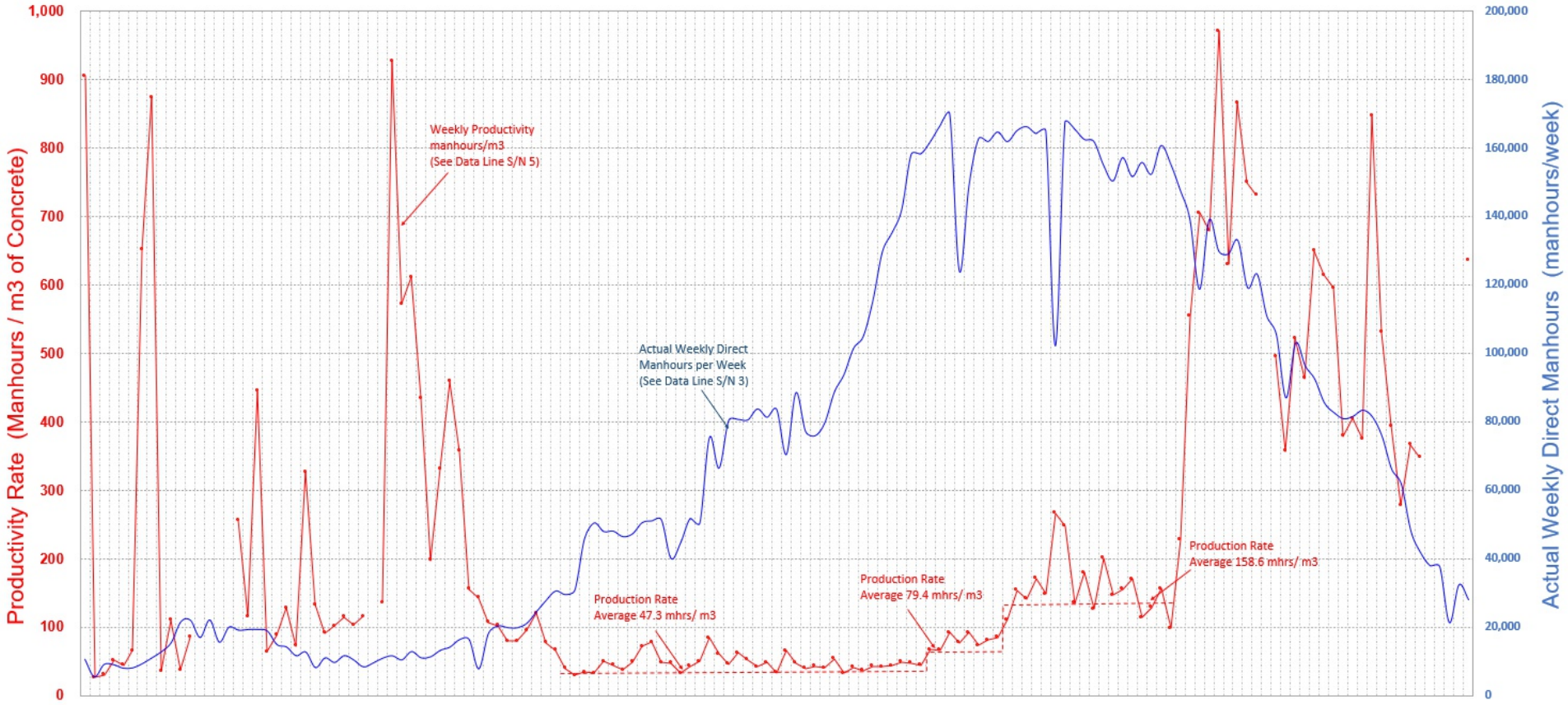
MEASURED MILE

Tsing Ma Bridge Construction

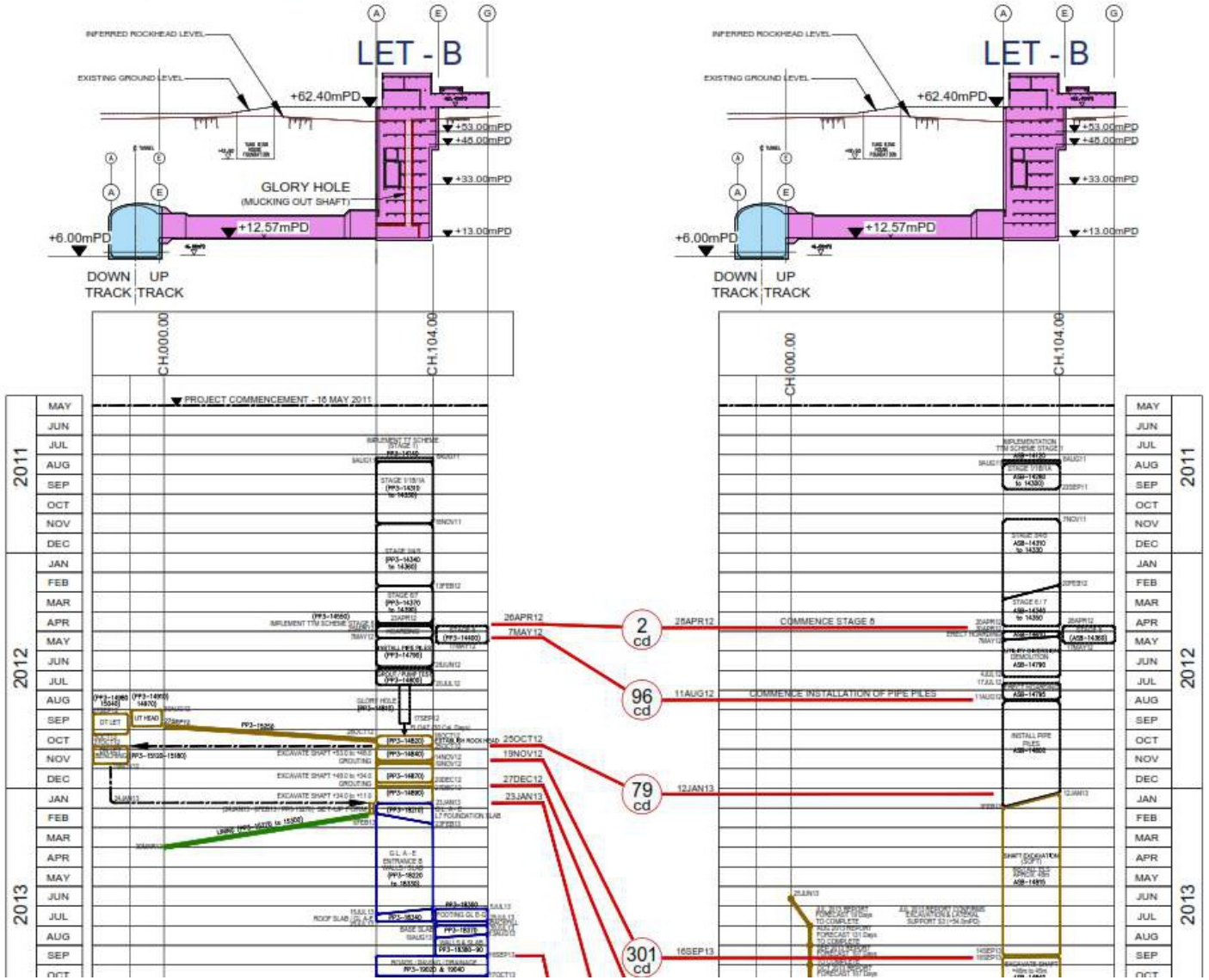
35,000 m2 of Formwork Fixing

Advantages
a) Measures Disruption
b) Acceleration Claims
c) Establishes Performance

Measured Mile Productivity Delay Assessment



BASELINE vs ASBUILT PROGRAMME



Baseline Productivity Delay Assessment

Baseline Productivity Delay Assessment

- Adopted the As-Planned compared to the Asbuilt Programme together with a more rigorous analysis assessing the delays at intervals during the construction of each building (i.e. time window/time slice analysis).

- Delay assessment methodology considers the actual progress over increments at a particular point in time. It recognizes any re-sequencing/modifications of the construction logic due to the effects of the delaying events.

- Analysis is based on the contemporaneous records (i.e daily diaries and progress reports) to access which party was responsible for the delay at the precise point during the construction.

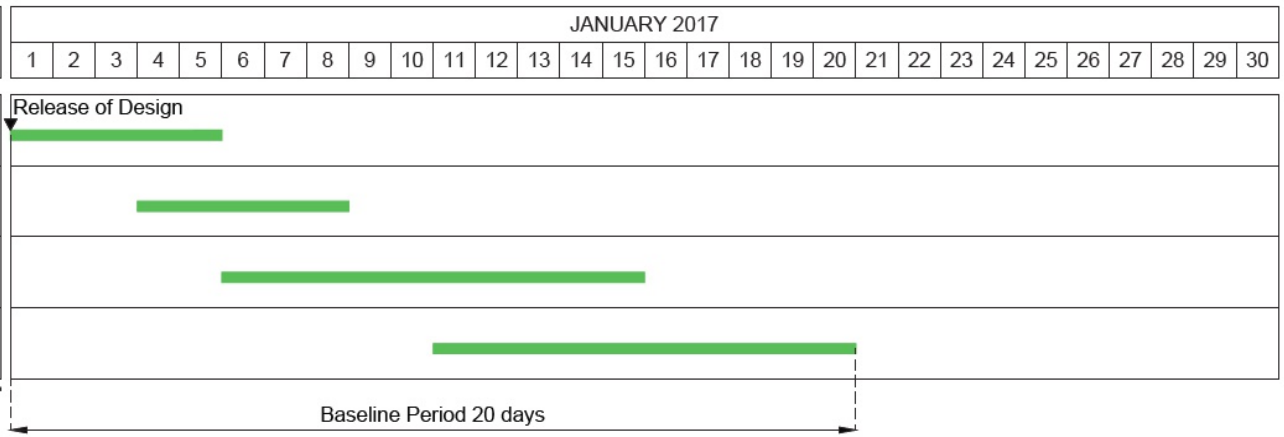
Methodology – Hypothetical Plan (1/9)

Step 1 Baseline Programme

Create simple chart of each activity to show the logic between the activities to complete the construction from 1 January 2017 to 20 January 2017.

Baseline Programme

Item	Description	Baseline Duration
1	Excavation	5 days
2	Baseslab	5 days
3	Superstructure	10 days
4	Finishes	10 days
Accomplish @ cutoff		30 days
Forecast Completion		20 Jan 17



In essence, the Subcontractor needs to complete 30 day/points of works to complete the works in 20 days (Say an average of 1.5 day points/day). Since we are adopting Baseline Productivity, the analysis is not distorted.

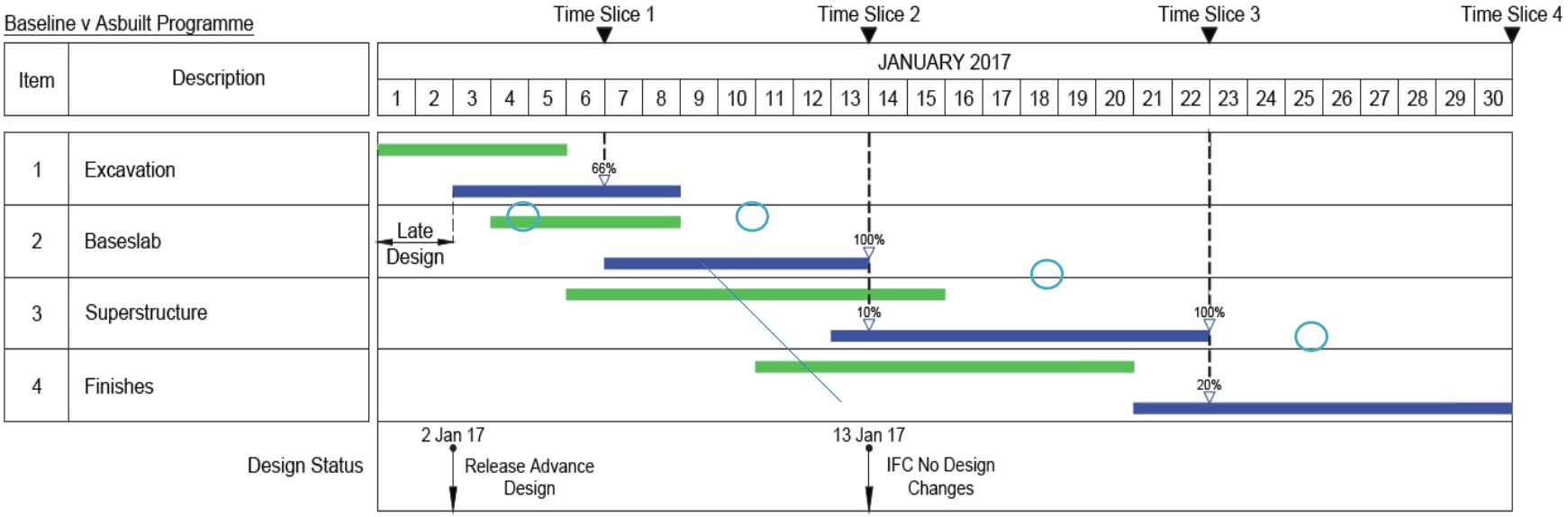
Step 2 – Asbuilt Programme

- I reviewed and initially adopted the asbuilt start and finish dates of each activity a shown in the weekly/monthly reports. Then, I reviewed the site diaries to verify the accuracy of the weekly/monthly reports to confirm the accuracy of the dates.

- To provide a fair assessment of each parties responsibility, I chose various time slices during the construction. For example, receipt of the first design, completion of base slab, superstructure, cladding, masonry work and finishes to assess the party responsible for the delays (if any).

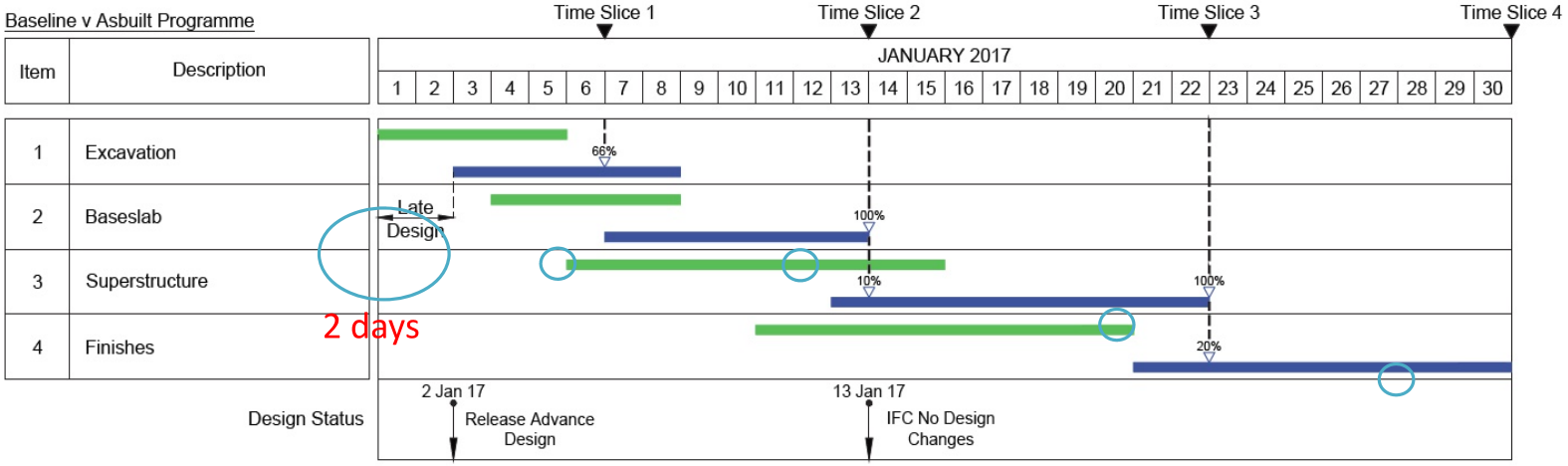
As shown in my hypothetical example, I chose four-time slices as follows;

- Time Slice 1 - Before the Commencement of Baseslab
- Time Slice 2 - Completion of Baseslab
- Time Slice 3 - Completion of Superstructure
- Time Slice 4 - Substantial Completion of Building



Then, I assess the actual progress of works based on the actual accomplishment of each activity as shown below;

Baseline v Asbuilt Programme



Asbuilt Progress Status

Item	Description	Time Slice 1	Time Slice 2	Time Slice 3	Time Slice 4
1	Excavation	66%	100%	100%	100%
2	Baseslab	0%	100%	100%	100%
3	Superstructure	0%	10%	100%	100%
4	Finishes	0%	0%	20%	100%
	Overall Achievement	8.3%	36.7%	60.0%	100%

13. Methodology – Hypothetical Plan (6/9)

Asbuilt Progress Status

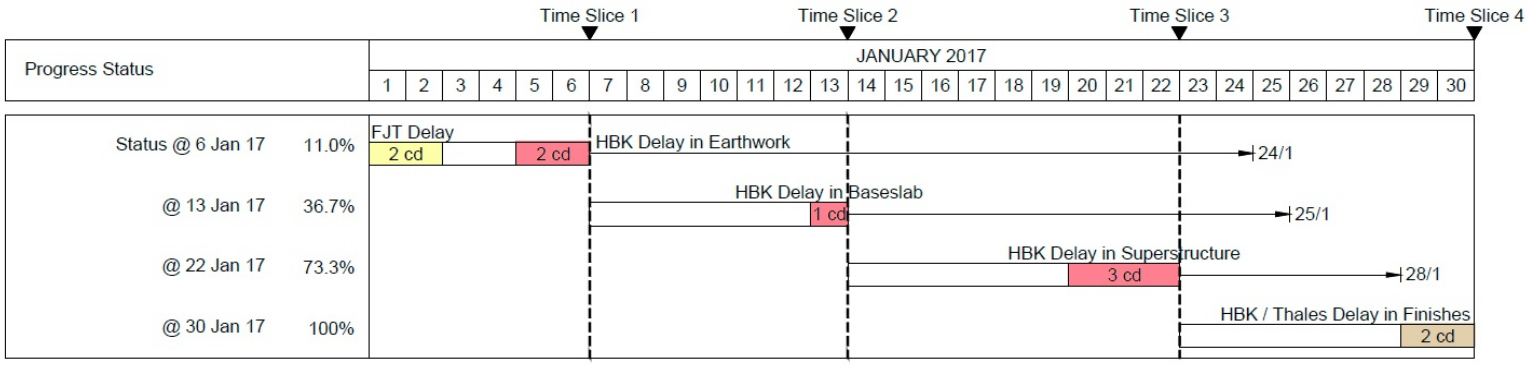
Item	Description	Time Slice 1												Time Slice 2												Time Slice 3												Time Slice 4					
		JANUARY 2017																																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30												
1	Excavation	66%						100%						100%						100%						100%																	
2	Baseslab	0%						100%						100%						100%						100%																	
3	Superstructure	0%						10%						100%						100%						100%																	
4	Finishes	0%						0%						20%						100%						100%																	
	Overall Achievement	8.3%						36.7%						60.0%						100%						100%																	

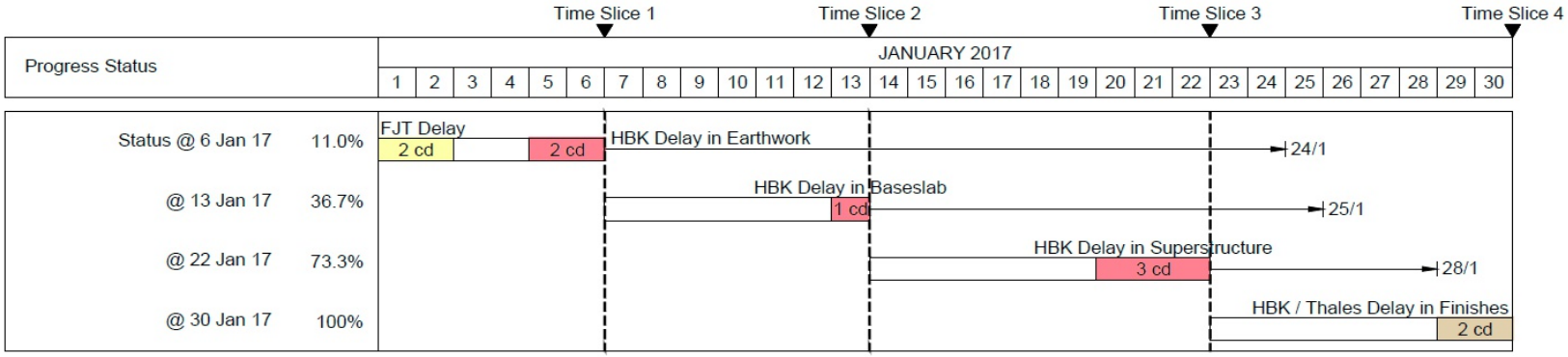
Item	Description of Work	Baseline cd	Delay Assessment Cut off Period (Time Slice)							
			06-Jan-17		13-Jan-17		22-Jan-17		30-Jan-17	
				7		9		8		
1	Excavation	5	66%	3.3	100%	5.0	100%	5.0	100%	5.0
2	Baseslab	5	0%	-	100%	5.0	100%	5.0	100%	5.0
3	Superstructure	10	0%	-	10%	1.0	100%	10.0	100%	10.0
4	Finishes	10	0%	-	0%	-	20%	2.0	100%	10.0
(A)	Accomplishment @ Cut Off	30		3.3		11.0		22.0		30.0
(B)	Equivalent % Complete			11.0%		36.7%		73.3%		100.0%
(C)	Balance of Period	20		18	Difference 6d	12		6		-
(D)	Forecast Completion @ Cut Off	20-Jan-17		24-Jan-17		25-Jan-17		28-Jan-17		30-Jan-17
(E)	Achieved in Period			11.0%		25.7%		36.7%		26.7%
(F)	Time Equivalent			2		6		6		6
(G)	Add to previous window				Late Design 2 days	12-Jan-17		19-Jan-17		28-Jan-17
(H)	Delay to this window					1		3		2
(I)	Delay Forecast @ Cut Off			4		5		8		10
(J)	Total Delay	10			Excavation Delay 2 days					

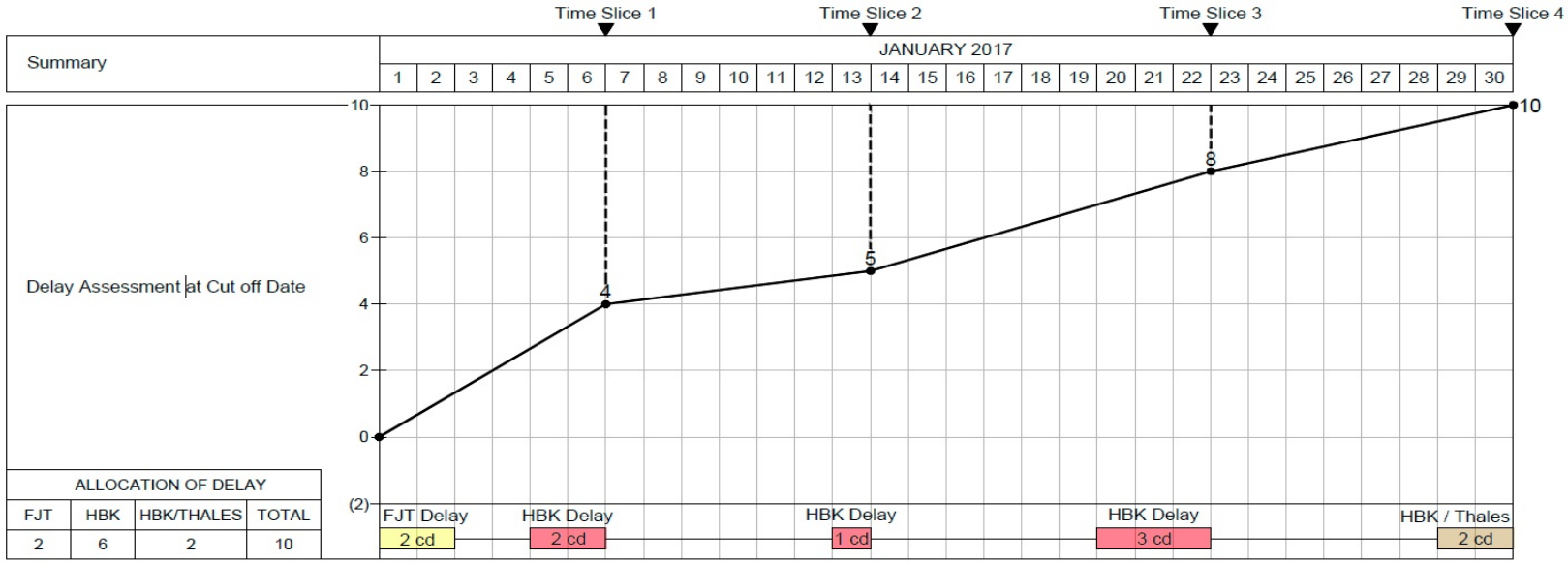
Item	Description of Work	Baseline cd	Delay Assessment Cut off Period (Time Slice)							
			06-Jan-17		13-Jan-17		22-Jan-17		30-Jan-17	
				7		9		8		
1	Excavation	5	66%	3.3	100%	5.0	100%	5.0	100%	5.0
2	Baseslab	5	0%	-	100%	5.0	100%	5.0	100%	5.0
3	Superstructure	10	0%	-	10%	1.0	100%	10.0	100%	10.0
4	Finishes	10	0%	-	0%	-	20%	2.0	100%	10.0
(A)	Accomplishment @ Cut Off	30		3.3		11.0		22.0		30.0
(B)	Equivalent % Complete			11.0%		36.7%		73.3%		100.0%
(C)	Balance of Period	20		18	Difference 6d	12		6		-
(D)	Forecast Completion @ Cut Off	20-Jan-17		24-Jan-17		25-Jan-17		28-Jan-17		30-Jan-17
(E)	Achieved in Period			11.0%		25.7%		36.7%		26.7%
(F)	Time Equivalent			2		6		6		6
(G)	Add to previous window					12-Jan-17		19-Jan-17		28-Jan-17
(H)	Delay to this window					1		3		2
(I)	Delay Forecast @ Cut Off			4		5		8		10
(J)	Total Delay	10								

Late Design 2 days

Excavation Delay 2 days







ALLOCATION OF DELAY			
FJT	HBK	HBK/THALES	TOTAL
2	6	2	10