



***EP* SPIRIT Award Proposal**

Maintenance Program as per Specific Pedestal Crane Manufacturers and Models

Starting Date:	01 JAN 2012
Completion Date:	30 APRIL 2013
Number of Team Members:	4



Contents

- Team Members
- STAR Model
 - Situation
 - Target
 - Action
 - Result
- Behaviors related to **EP SPIRIT**

Team Members

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Company name* includes PTTEP, PTTEP Services, PTTEP subsidiaries (please specify).

Project Objectives

- To enhance Reliability and integrity for PTTEP's offshore cranes.
- To provide preventive maintenance program for pedestal crane in order to comply with O&M manual, International Standard ,MTBF, Failure Analysis,4YPM & 8YPM experience ,Thai law & regulation.
- To minimize corrective maintenance cost impact for crane operations.





STAR Model



Situation

PTTEP have pedestal cranes used on offshore installations totally 100 cranes in year 2016 and they are divided into 6 Manufacturers, 16 models, 25 Types.

Meanwhile original maintenance program (2 types of job task card - Box Boom and Lattice Boom) is inadequate and not completely applied for all the cranes which have diversifying design in subcomponent, arrangement and model.



STAR Model



Target

To establish comprehensive maintenance program which is specific each crane type and model.

Action

To collect & group the crane which have same model & specification, common subcomponent and create specific maintenance job task card for each group.

Result

To minimize cost impact due to corrective maintenance for crane operations.

To beside the cranes have been improved in reliability & integrity by improvement of crane maintenance program

To create organization knowledge management in PTTEP.

Project Details



Situation

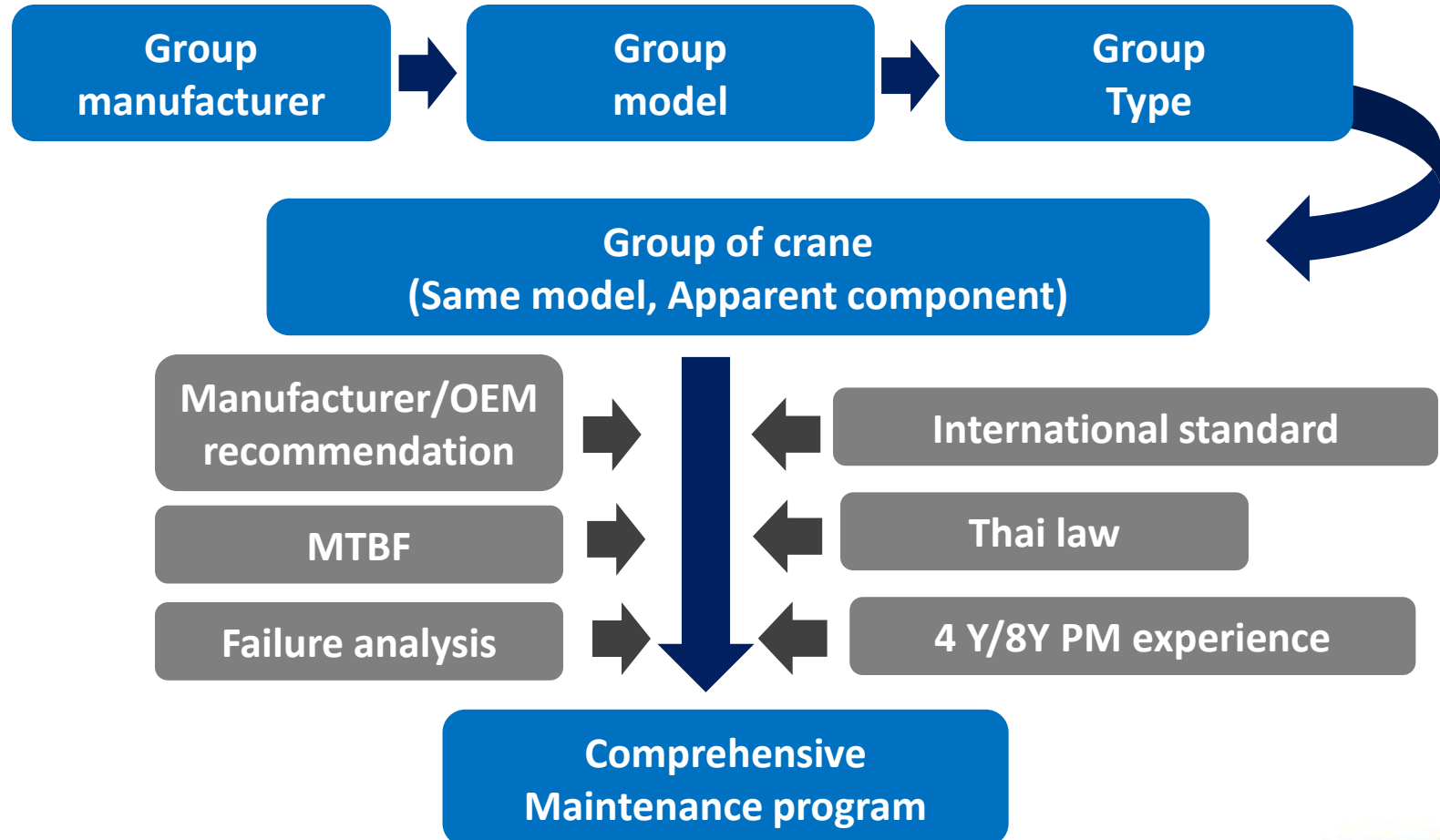
PTTEP have used pedestal cranes widely on the offshore installation about 100 cranes in year 2016 and they are now consisting of 6 Manufacturers, 16 models, and 25 Types. So that, maintenance and inspection program of crane shall be specifically adjusted for each group since different brand or model have different subcomponent.

By the aforementioned, maintenance program have been developed according to each crane manufacturer recommendation, international standard, Thai law & regulation and compliance with company policies.

Project Details



Development of individual maintenance strategy



Pedestal Crane List:

6 Manufacturers, 16 Models, 25 Types

1. American Aero Crane: 3 Models, 4 Types.

I	Ass	Development	Location	Description	Platform	Completion	Manufacturer	Model Number	Types
1	GBN	3A	Y-2611	Deck Crane	FS02	FS02	American Aero	B65	A
2	GBN	3A	Y-2621	Provision Crane	FS02	FS02	American Aero	B20	B
15	GBN	3A	X-1905	Pedestal Crane WP09	WP09	Remote	American Aero	OM-455	I
16	GBN	3A	X-2005	Pedestal Crane WP10	WP10	Remote	American Aero	OM-455	I
17	GBN	3B	X-2105	Pedestal Crane WP11	WP11	Remote	American Aero	OM-455	I1
18	GBN	3B	X-2205	Pedestal Crane WP12	WP12	Remote	American Aero	OM-455	I1
20	GBN	3D	X-2405	Pedestal Crane WP14	WP14	Remote	American Aero	OM-455	K

2. Favelle Favco Crane: 3 Models, 8 Types.

I	Asi	Developm	Location	Description	Platfo	Comp	Manufact	Model Number	Types
21	GBN	3E	X-2505	Pedestal Crane WP15	WP15	Remote	Favelle Favco	100RL	L
22	GBN	3E	X-2605	Pedestal Crane WP16	WP16	Remote	Favelle Favco	100RL	L
23	GBN	3E	X-2705	Pedestal Crane WP17	WP17	Remote	Favelle Favco	100RL	L
24	GBN	3F	X-2805	Pedestal Crane WP18	WP18	Remote	Favelle Favco	100RL	L
25	GBN	3F	X-2905	Pedestal Crane WP19	WP19	Remote	Favelle Favco	100RL	L
26	GBN	3F	X-10006	Pedestal Crane WP20	WP20	Remote	Favelle Favco	100RL	L
27	GBN	3G	X-10106	Pedestal Crane WP21	WP21	Remote	Favelle Favco	100RL	L
28	GBN	3G	X-10206	Pedestal Crane WP22	WP22	Remote	Favelle Favco	100RL	L
38	GBN	3M(2014)	1X-3273	Pedestal Crane WP32	WP32	Remote	Favelle Favco	100RL	Y
39	GBN	3M(2014)	1X-3373	Pedestal Crane WP33	WP33	Remote	Favelle Favco	100RL	Y
40	GBN	3M(2014)	1X-3473	Pedestal Crane WP34	WP34	Remote	Favelle Favco	100RL	Y
41	GBN	3M(2014)	1X-3573	Pedestal Crane WP35	WP35	Remote	Favelle Favco	100RL	Y
42	GBN	2015	1X-3673	Pedestal Crane WP36	WP36	Remote	Favelle Favco	100RL	Y(tentative)
43	GBN	2015	1X-3773	Pedestal Crane WP37	WP37	Remote	Favelle Favco	100RL	Y(tentative)
44	GBN	2015	1X-3873	Pedestal Crane WP38	WP38	Remote	Favelle Favco	100RL	Y(tentative)
45	GBS	4A	2X-6900	Pedestal Crane QPS	QPS	Complex	Favelle Favco	100RL	N
57	GBS	4C(2016)	2X-1173	Pedestal Crane WPs11	WPs11	Remote	Favelle Favco	100RL	Y
58	GBS	4C(2016)	2X-1273	Pedestal Crane WPs12	WPs12	Remote	Favelle Favco	100RL	Y
59	GBS	4C(2016)	2X-1373	Pedestal Crane WPs13	WPs13	Remote	Favelle Favco	100RL	Y
60	GBS		2X-1473	Pedestal Crane WPs14	WPs14	Remote	Favelle Favco	100RL	Y(tentative)
61	ART	1A	CR-7000	Pedestal Crane APP	APP	Complex	Favelle Favco	7.5/10K	Q
62	ART	1A	CR-7010	Pedestal Crane APP	APP	Complex	Favelle Favco	7.5/10K	Q
64	ART	1A	CR-7020	Pedestal Crane AQP	AQP	Complex	Favelle Favco	200RL	R
65	ART	1A	X-0191	Pedestal Crane AWP01	AWP01	Complex	Favelle Favco	100RL	S
66	ART	1A	X-0291	Pedestal Crane AWP02	AWP02	Remote	Favelle Favco	100RL	T
67	ART	1A	X-0391	Pedestal Crane AWP03	AWP03	Remote	Favelle Favco	100RL	T
68	ART	1A	X-0491	Pedestal Crane AWP04	AWP04	Remote	Favelle Favco	100RL	T
69	ART	1A	X-0591	Pedestal Crane AWP05	AWP05	Remote	Favelle Favco	100RL	T
70	ART	1A	X-0691	Pedestal Crane AWP06	AWP06	Remote	Favelle Favco	100RL	T
71	ART	1B	X-0791	Pedestal Crane AWP07	AWP07	Remote	Favelle Favco	100RL	U
72	ART	1B	X-0891	Pedestal Crane AWP08	AWP08	Remote	Favelle Favco	100RL	U
73	ART	1B	X-0991	Pedestal Crane AWP09	AWP09	Remote	Favelle Favco	100RL	U
74	ART	1B	X-1091	Pedestal Crane AWP10	AWP10	Remote	Favelle Favco	100RL	U
75	NAD		X-1N91	Pedestal Crane AWP1N	AWP1N	Remote	Favelle Favco	100RL	U
76	NAD		X-2N91	Pedestal Crane AWP2N	AWP2N	Remote	Favelle Favco	100RL	U
77	ART	1C	X-3N91	Pedestal Crane AWP3N	AWP3N	Remote	Favelle Favco	100RL	U
97	ART	2D(2015)	3X-3073	Pedestal Crane AWP30	AWP30	Remote	Favelle Favco	100RL	Y(tentative)
98	ART	2D(2015)	3X-3173	Pedestal Crane AWP31	AWP31	Remote	Favelle Favco	100RL	Y(tentative)
99	ART	2D(2015)	3X-3273	Pedestal Crane AWP32	AWP32	Remote	Favelle Favco	100RL	Y(tentative)
100	ART	2D(2015)	3X-3373	Pedestal Crane AWP33	AWP33	Remote	Favelle Favco	100RL	Y(tentative)
101	ART	2E(2016)	3X-3473	Pedestal Crane AWP34	AWP34	Remote	Favelle Favco	100RL	Y(tentative)
102	ART	2E(2016)	3X-3573	Pedestal Crane AWP35	AWP35	Remote	Favelle Favco	100RL	Y(tentative)
103	ART	2E(2016)	3X-3673	Pedestal Crane AWP36	AWP36	Remote	Favelle Favco	100RL	Y(tentative)
104	ART	2E(2016)	3X-3773	Pedestal Crane AWP37	AWP37	Remote	Favelle Favco	100RL	Y(tentative)

3. HydraLift Crane: 5 Models, 5 Types.

I	Ass	Developme	Location	Description	Platfor	Comple	Manufacture	Model Number	Types
3	GBN	1	X-6600	Pedestal Crane QP	QP	Complex	Hydralift	OMCV-1610	C
4	GBN	1	X-5880	Pedestal Crane PP	PP	Complex	Hydralift	OMCV-2398	D
7	GBN	1	X-5860	Pedestal Crane WP01	WP01	Complex	Hydralift	OMCV-2201	G
10	GBN	2	X-1405	Pedestal Crane WP04	WP04	Remote	Hydralift	OMCV1800	H
11	GBN	2	X-1505	Pedestal Crane WP05	WP05	Remote	Hydralift	OMCV1800	H
12	GBN	2	X-1605	Pedestal Crane WP06	WP06	Remote	Hydralift	OMCV1800	H
13	GBN	2	X-1705	Pedestal Crane WP07	WP07	Remote	Hydralift	OMCV1800	H
14	GBN	2	X-1805	Pedestal Crane WP08	WP08	Remote	Hydralift	OMCV1800	H
19	GBN	3C	X-2305	Pedestal Crane WP13	WP13	Remote	Hydralift	H080007	J

4. Liebherr Crane: 2 Models, 2 Types.

I	Ass	Developme	Location	Description	Platfor	Comple	Manufacture	Model Number	Types
6	GBN	3C	X-8640	Pedestal Crane SPP	SPP	Complex	LIEBHERR	RL 1500-20	F
46	GBS	4A	2Z-5801	Pedestal Crane PPS	PPS	Complex	LIEBHERR	BOS 2600-30 EX LITRONIC	O

5. Mape Crane: 1 Models, 1 Type.

I	Ass	Developme	Location	Description	Platfor	Comple	Manufacture	Model Number	Types
5	GBN	2	X-9820	Pedestal Crane RP	RP	Complex	mape	94.893.10	E

6. Nautilus Crane: 2 Models, 5 Types.

1	As	Developn	Location	Description	Platfo	Comp	Manufactu	Model Number	Types
8	GBN	MOD	X-1205	Pedestal Crane WP02	WP02	Remote	Nautilus	180B-70	X(BUN)
9	GBN	MOD	X-1305	Pedestal Crane WP03	WP03	Remote	Nautilus	180B-70	X(BUN)
29	GBN	3H	X-10306	Pedestal Crane WP23	WP23	Remote	Nautilus	180B-70	M
30	GBN	3H	X-10406	Pedestal Crane WP24	WP24	Remote	Nautilus	180B-70	M
31	GBN	3H	X-10506	Pedestal Crane WP25	WP25	Remote	Nautilus	180B-70	M
32	GBN	3J	1X-2673	Pedestal Crane WP26	WP26	Remote	Nautilus	180B-70	X(BUN)
33	GBN	3J	1X-2773	Pedestal Crane WP27	WP27	Remote	Nautilus	180B-70	X(BUN)
34	GBN	3K	1X-2873	Pedestal Crane WP28	WP28	Remote	Nautilus	180B-70	X(BUN)
35	GBN	3K	1X-2973	Pedestal Crane WP29	WP29	Remote	Nautilus	180B-70	X(BUN)
36	GBN	3L(2013)	1X-3073	Pedestal Crane WP30	WP30	Remote	Nautilus	180B-70	X(BUN)
37	GBN	3L(2013)	1X-3173	Pedestal Crane WP31	WP31	Remote	Nautilus	180B-70	X(BUN)
47	GBS	4A	2Z-5803	Pedestal Crane WPs01	WPs01	Complex	Nautilus	180BHD-80	P
48	GBS	4A	2X-1206	Pedestal Crane WPs02	WPs02	Remote	Nautilus	180B-70	M
49	GBS	4A	2X-1306	Pedestal Crane WPs03	WPs03	Remote	Nautilus	180B-70	M
50	GBS	4A	2X-1406	Pedestal Crane WPs04	WPs04	Remote	Nautilus	180B-70	M
51	GBS	4A	2X-1506	Pedestal Crane WPs05	WPs05	Remote	Nautilus	180B-70	M
52	GBS	4A	2X-1606	Pedestal Crane WPs06	WPs06	Remote	Nautilus	180B-70	M
53	GBS	4B(2013)	2X-0773	Pedestal Crane WPs07	WPs07	Remote	Nautilus	180B-70	X(BUN)
54	GBS	4B(2013)	2X-0873	Pedestal Crane WPs08	WPs08	Remote	Nautilus	180B-70	X(BUN)
55	GBS	4B(2013)	2X-0973	Pedestal Crane WPs09	WPs09	Remote	Nautilus	180B-70	X(BUN)
56	GBS	4B(2013)	2X-1073	Pedestal Crane WPs10	WPs10	Remote	Nautilus	180B-70	X(BUN)
78	ART	1C	X-1291	Pedestal Crane AWP12	AWP12	Remote	Nautilus	180B-70	V
79	ART	1C	X-1391	Pedestal Crane AWP13	AWP13	Remote	Nautilus	180B-70	V
80	ART	1C	X-1491	Pedestal Crane AWP14	AWP14	Remote	Nautilus	180B-70	V
81	ART	1D	X-1190	Pedestal Crane AWP11	AWP11	Remote	Nautilus	180B-70	V
82	ART	1D	X-1591	Pedestal Crane AWP15	AWP15	Remote	Nautilus	180B-70	V
83	ART	1D	X-1691	Pedestal Crane AWP16	AWP16	Remote	Nautilus	180B-70	W
84	ART	1D	X-1791	Pedestal Crane AWP17	AWP17	Remote	Nautilus	180B-70	W
85	ART	2A	3X-1873	Pedestal Crane AWP18	AWP18	Remote	Nautilus	180B-70	X(BUN)
86	ART	2A	3X-1973	Pedestal Crane AWP19	AWP19	Remote	Nautilus	180B-70	X(BUN)
87	ART	2A	3X-2073	Pedestal Crane AWP20	AWP20	Remote	Nautilus	180B-70	X(BUN)
88	ART	2A	3X-2173	Pedestal Crane AWP21	AWP21	Remote	Nautilus	180B-70	X(BUN)
89	ART	2B(2013)	3X-2273	Pedestal Crane AWP22	AWP22	Remote	Nautilus	180B-70	X(BUN)
90	ART	2B(2013)	3X-2373	Pedestal Crane AWP23	AWP23	Remote	Nautilus	180B-70	X(BUN)
91	ART	2B(2013)	3X-2473	Pedestal Crane AWP24	AWP24	Remote	Nautilus	180B-70	X(BUN)
92	ART	2B(2013)	3X-2573	Pedestal Crane AWP25	AWP25	Remote	Nautilus	180B-70	X(BUN)
93	ART	2C(2014)	3X-2673	Pedestal Crane AWP26	AWP26	Remote	Nautilus	180B-70	X(BUN)
94	ART	2C(2014)	3X-2773	Pedestal Crane AWP27	AWP27	Remote	Nautilus	180B-70	X(BUN)
95	ART	2C(2014)	3X-2873	Pedestal Crane AWP28	AWP28	Remote	Nautilus	180B-70	X(BUN)
96	ART	2C(2014)	3X-2973	Pedestal Crane AWP29	AWP29	Remote	Nautilus	180B-70	X(BUN)

Project Details



❑ Example Major Activities

- Slew bolts replacement every 8 years
From MTBF, slew bolts tend to crack and it need replacement at 8th -9th year.



Project Details



❑ Example Major Activities

- Sheave Bearing replacement every 4 years
From experience, Found pitting at sheave bearing condition every 4 years.



Project Details



❑ Example of PM job plan improvement

No	Task	Generic	Improvement
1	Radiator/ oil cooler PM	Inspection every 3 month And replace based on condition.	Nautilus – Require replacement every 4 years Others – Require replacement every 8 years
2	Ball bearing clearance measurement	Tilting method	Nautilus –Rotation method Others –Tilting method
2	Gearbox – Winches, Slew	Oil analysis	Braden – Overhaul & NDT every 4 years Rexroth, David brown – Overhaul & NDT every 8 years

Conclusion

Conclusion

PM job task card for offshore crane has developed by PTTEP effort and experience under standard and regulation to cope variety of brand, model and types. Apart from reliability and integrity, this practice contributes knowledge and embed worthy lesson learnt to PTTEP in present and future.





EP SPIRIT

- Which **EP SPIRIT** behavior(s) lead to your achievement?
 - Synergy, Performance Excellent and Innovation



End of Presentation