Suspended Working Platform (SWP) Seminar

Sec 1. SWP Safety Track Record

Sec 2 Improvements

Sec 2.1 Improvements – Equipment

Sec 2.2 Improvements - Installation

Sec 2.3 Improvements - Legislation, COP and Guidelines , Documentation

Sec 3 Suggestions

Sec 3.1 Suggestions – Guidelines and Documentation

Sec 3.2 Suggestions – Monitoring

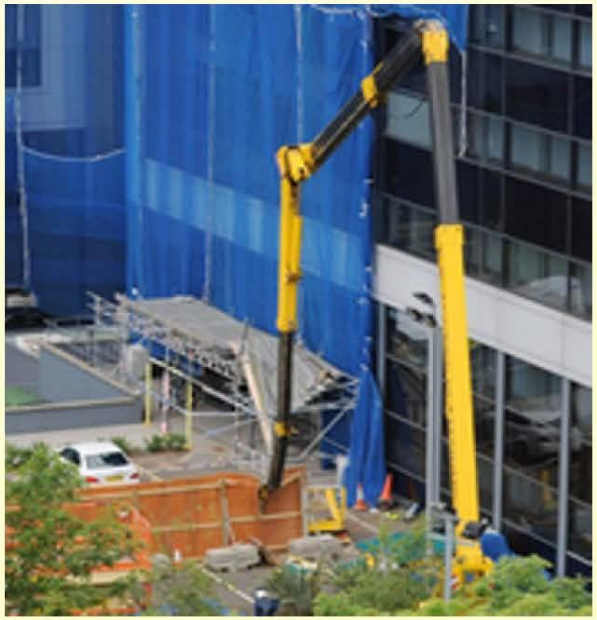
Sec 3.3 Suggestions - Equipment

SWP Safety Track Record

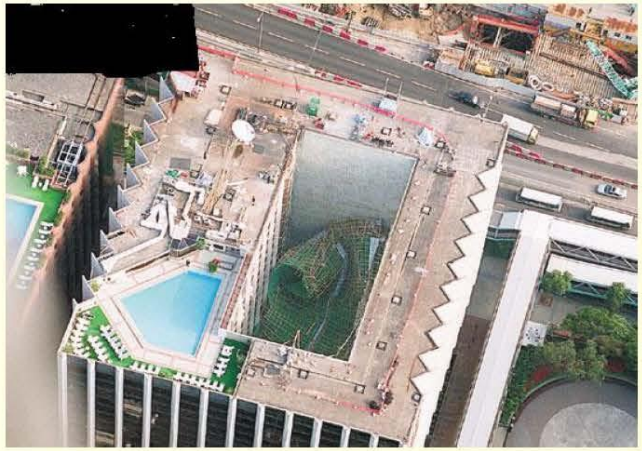
In Hong Kong Suspended Working Platform (Gondola) Fatal Accident Due To Equipment Failure Since 1997 is **ZERO**

Aerial Platform Fatal Accident – Due To Equipment Failure

Aerial Platform Fatal Accident – Due To Equipment Failure

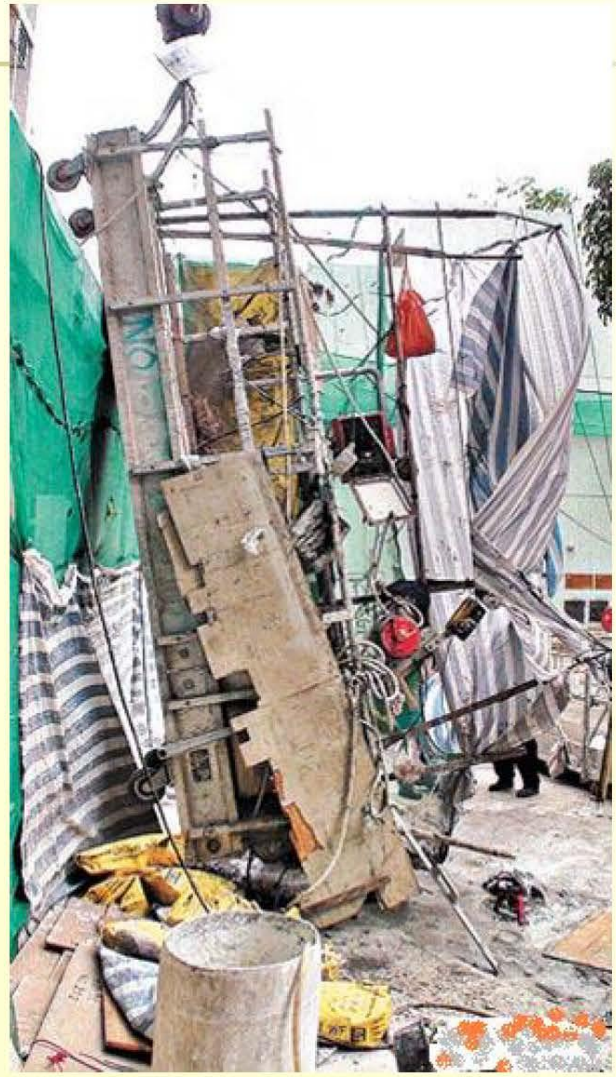


Scaffold Fatal Accident – Due To Failure Equipment Failure

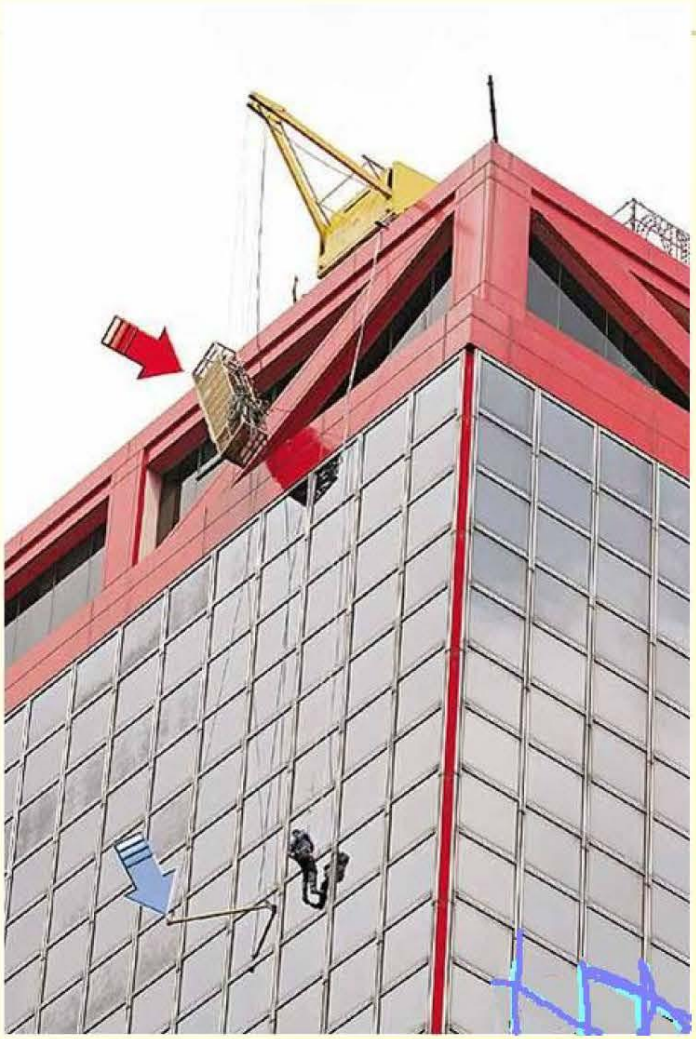


Gondola Accident – Equipment Failure

Gondola Accident – Equipment Failure



Gondola Accident – Equipment Failure



Gondola Fatal Accident – Equipment Failure And Operator(s) Failed To Use Safety Equipment Provided

Sec 2. Improvement

Sec 2.1 Improvements – Equipment

Before	Improvement
Climber Motor WLL 500 kg	WLL 630 kg to WLL 800 kg

Before

Climber Disc Motor without cooling will overheat when continue operating i.e. tall building

Improvement

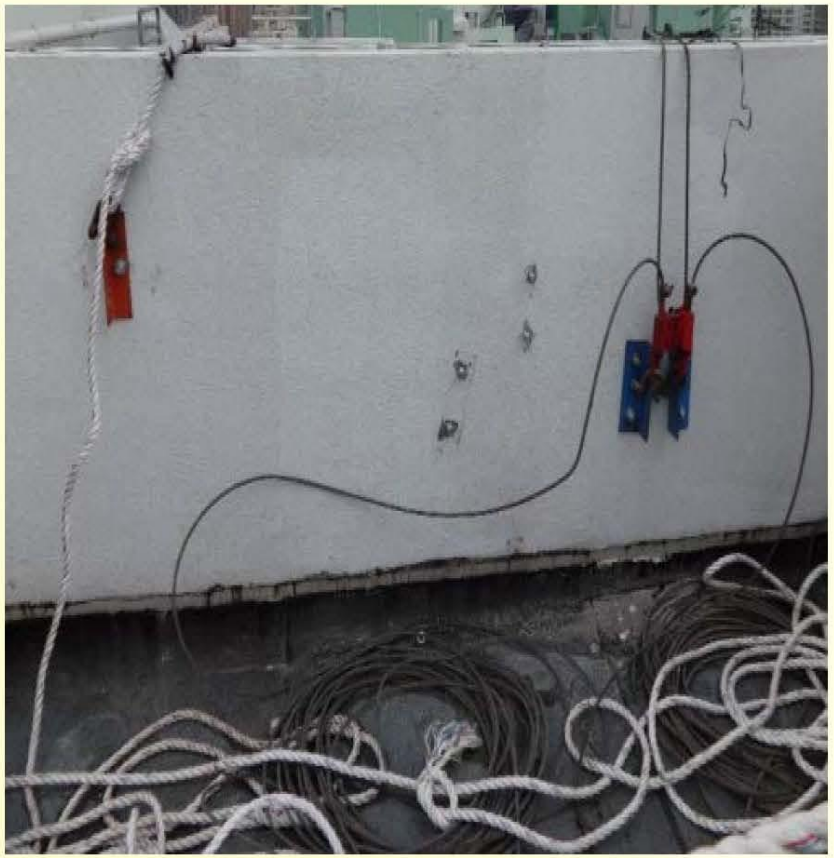
Motor with heat sink and cooling fan

Before	Improvement
Excessive wear and tear of sun gear lead to gear box failure	Worm gear

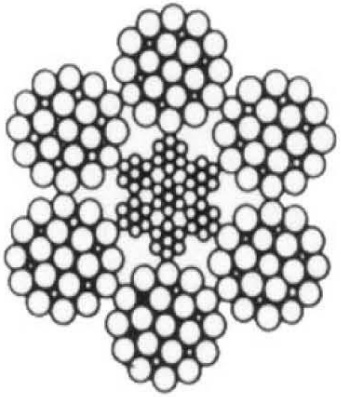
Before	Improvement
Excessive wear and tear of sun gear lead to gear box failure	Sun gear increase in size

Before	Improvement
Safety Lock (centrifugal type) fails to protect SWP from excessive tilting in slow failing e.g. gear box failure , dead man switch malfunctioning	Dual protection lock

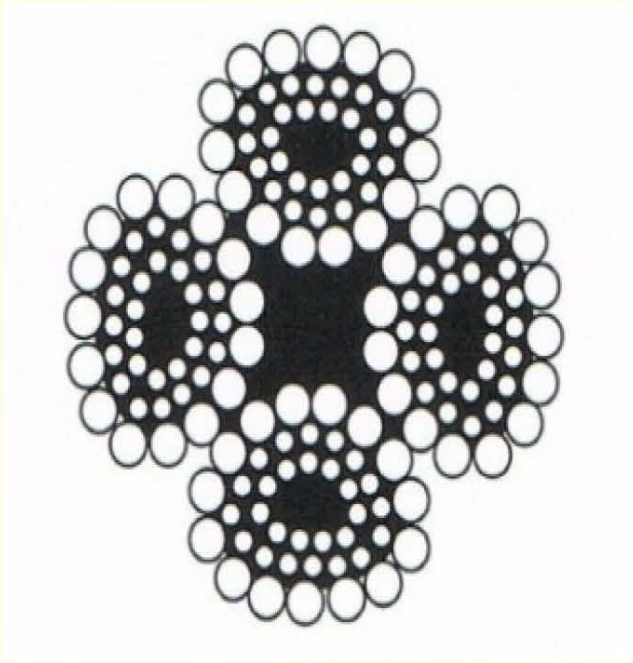
Before	Improvement
Eye bolt is unreliable	Anchor bracket is more reliable



Before	Improvement
Suspension wire - 6 strands bird caging , kinking	Torque less wire - 4 strands



6 x 25 FW
(12/6 & 6 F/1)



Before	Improvement
Will cause damage to wire rope , also time consuming to install	Wedge socket less damaging to the suspension wire , Save installation time

Before

Hand tools are
slow and no measurement of
tightening torque

Improvement

Cordless power tools are more
efficient and tightening with more
accurate torque

Before	Improvement
IP 44 weather proof insufficient protection against ingress of water	IP67 plug employ watertight

Sec 2.2 Improvement – Installation

Before	Improvement
Anchor Bolts Failure	Clamp , wrap round , instead of pulling out the bolts shearing of the bolts to be employed

Before

Anchor bolts damaging building structure

Improvement

Clamp , Wrap round , Non destructive method

Before	Improvement
Building structure damage due to overloading	Inner pulling method , Saddle method

Before

Anchor bolts damaging building structure

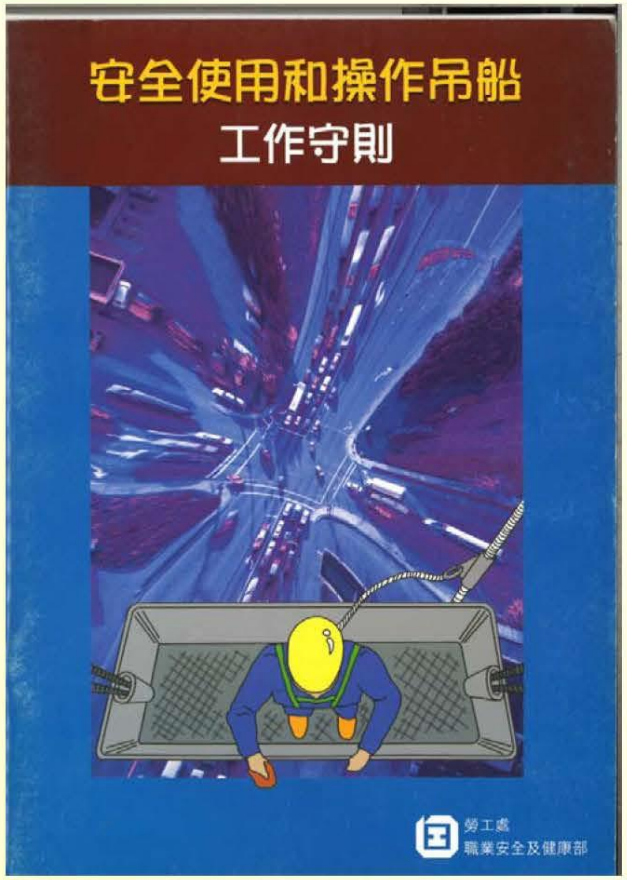
Improvement

Clamp , wrap round , Non destructive method

Before	Improvement
Failure of outrigger (COP sect 2 2.1)	Saddle operation

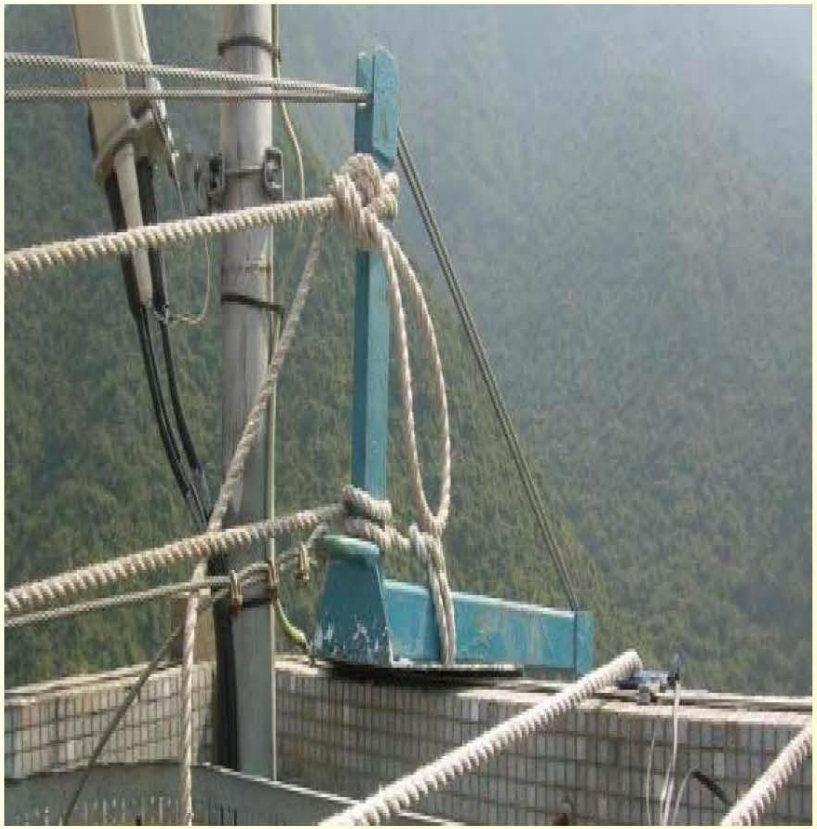
Sec 2.3 Improvement – Legislation COP and Guidelines

Before	Improvement
F&IU Cap 59 (Lifting Gear and Lifting Appliance) Regulations Lack of standard and rules	COP , F&IU Cap 59 (SWP) Regulations setting written guide line for partitioned



Court Case

Court Case



The Judge further states that the Code of Practice of Labour Department provides guideline for practitioners. It does not mean that the practitioner must install outriggers as illustrated by the Code. The practitioners must, however, ensure that the outriggers was firmly anchored.

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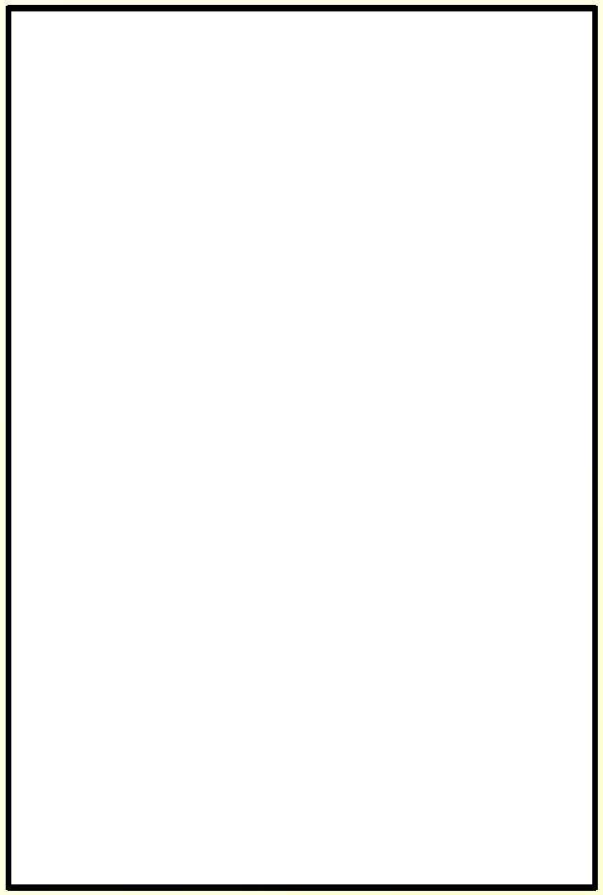
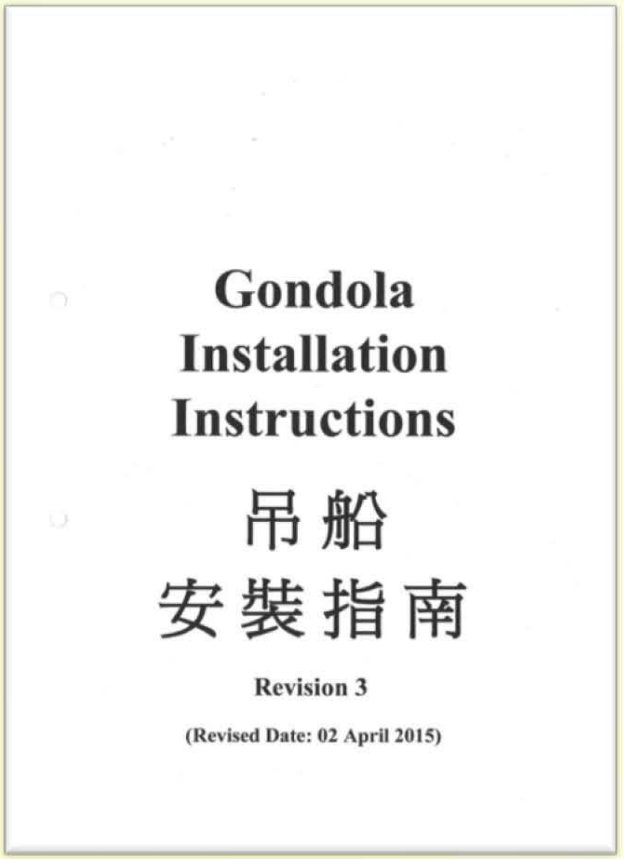
Before

Solely relied on installation skill and experience of individual worker
Lack of standard and reference



Improvement

Installation instruction provide standard and guide line for installation workers

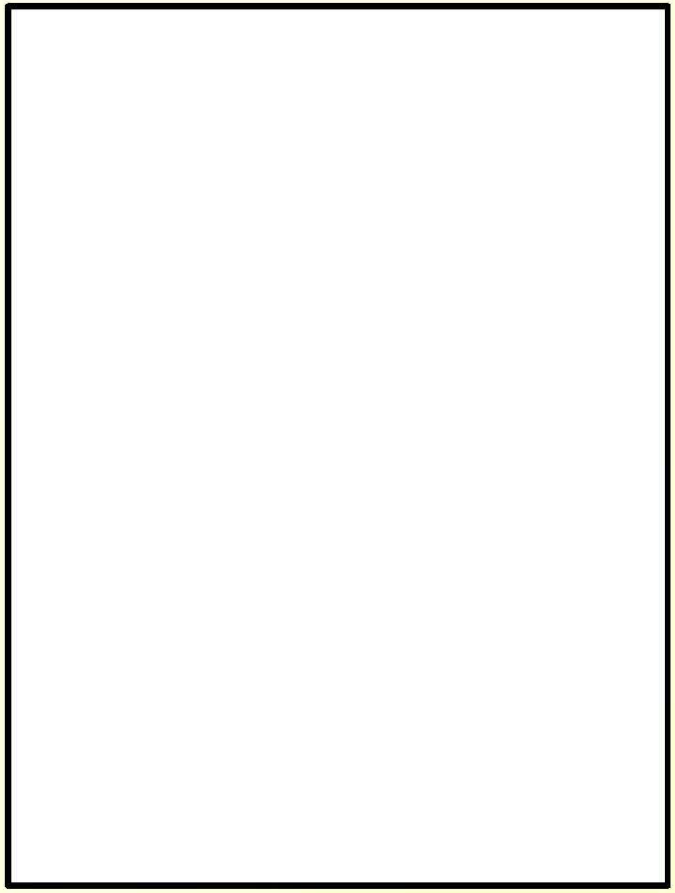


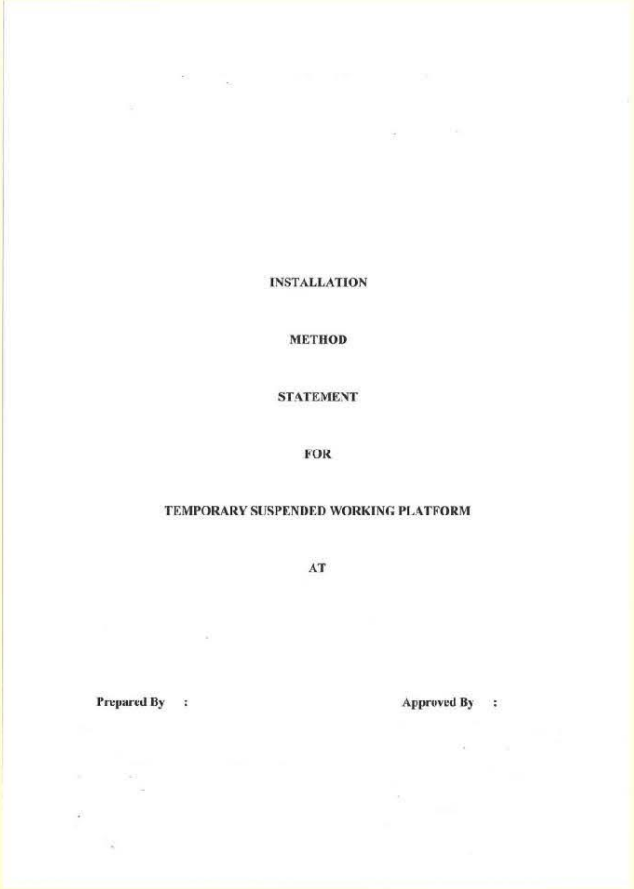
Before

No documents to serve as reference for installation workers

Improvement

Installation method statement as guideline and reference for installation workers





INSTALLATION

METHOD

STATEMENT

FOR

TEMPORARY SUSPENDED WORKING PLATFORM

AT

Prepared By :

Approved By :

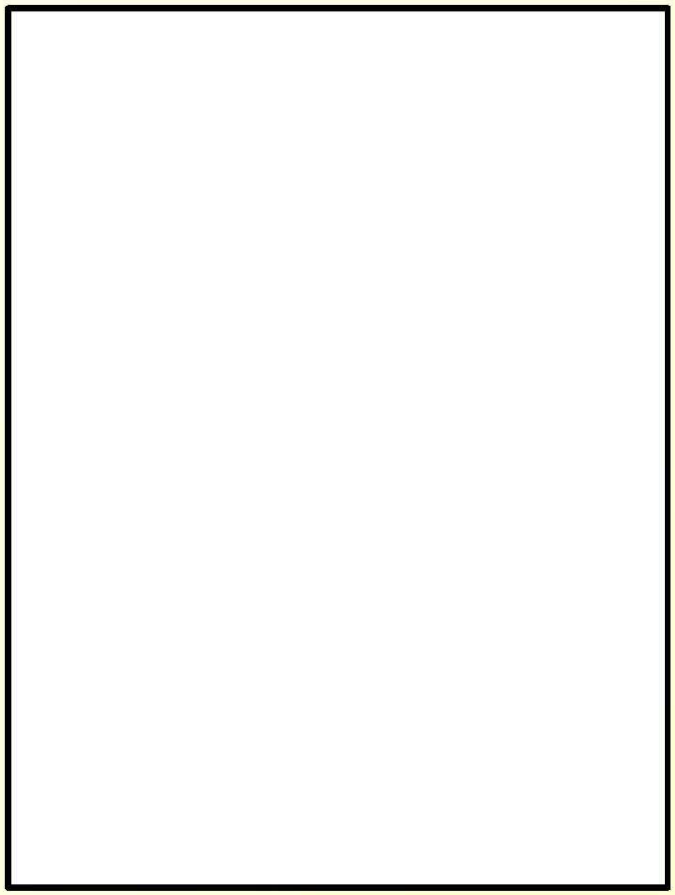
Before

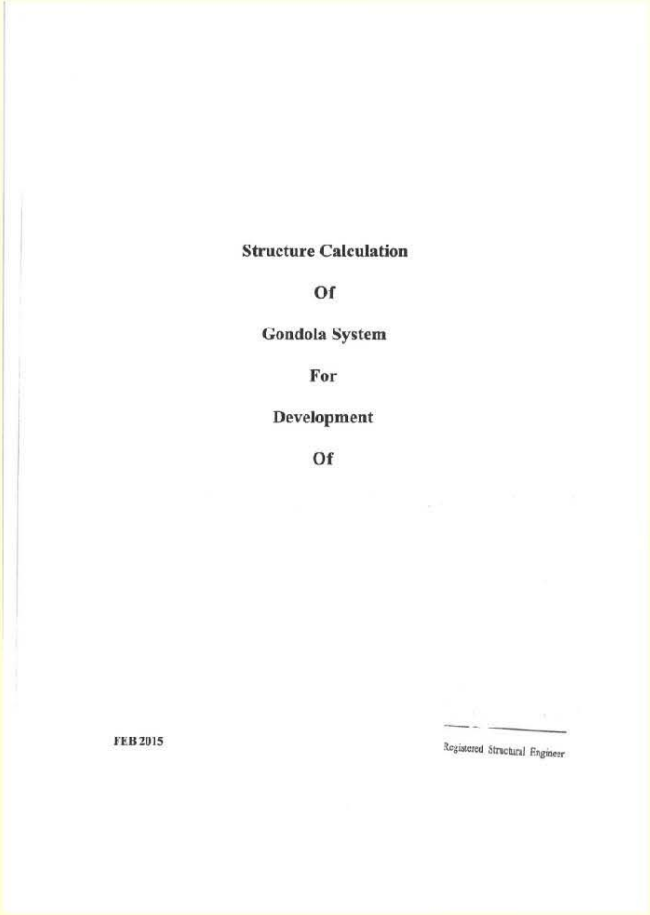
No design calculation

Practitioner has no information of the building structure

Improvement

provide structural information for practitioner





Structure Calculation

Of

Gondola System

For

Development

Of

FEB 2015

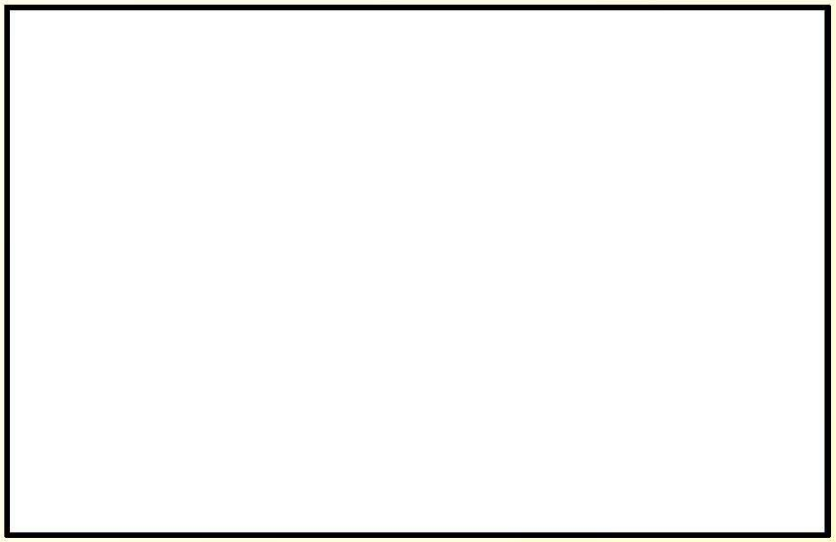
Registered Structural Engineer

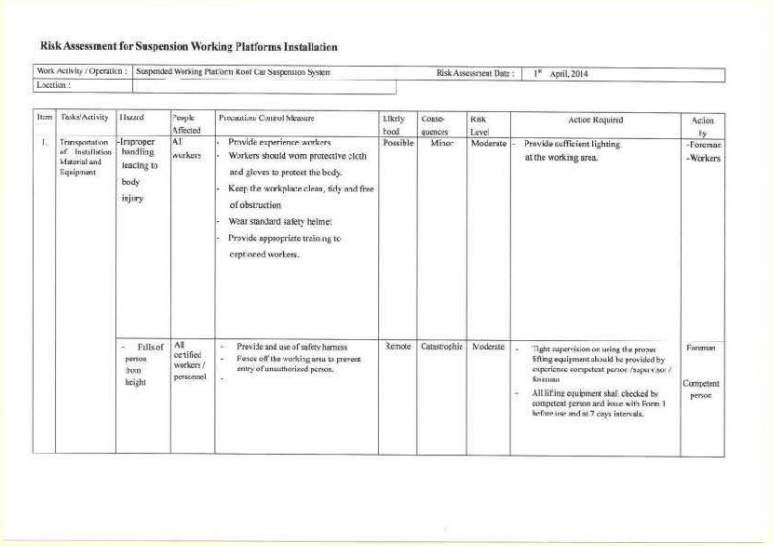
Before

Practitioner has no information of the risk they are facing and safety measure to be taken

Improvement

Provide systematic assessment of risk portioned are facing and safety measure to be carry out





Risk Assessment for Suspension Working Platforms Installation

Work Activity / Operation :	Suspended Working Platform Roof Car Suspension System	Risk Assessment Date :	1st April, 2014
Location :			

Item	Tasks/Activity	Hazard	People Affected	Precautions Control Measure	Likely hood	Conse-quences	Risk Level	Action Required	Action by
1.	Transportation of Installation Material and Equipment	-Improper handling leacing to body injury	All workers	- Provide experience workers - Workers should wom protective cloth and gloves to protect the body. - Keep the workplace clean, tidy and free of obstruction - Wear standard safety helme: - Provide appropriate training to experienced workers.	Possible	Minor	Moderate	- Provide sufficient lighting at the working area.	-Foreman -Workers
		- Falls of person from height	All certified workers / personnel	- Provide and use of safety harness - Fence off the working area to prevent entry of unauthorized person. -	Remote	Catastrophic	Moderate	- Tight supervision on using the proper lifting equipment should be provided by experience competent person /supervisor / foreman - All lifting equipment shall checked by competent person and issue with Form 1 before use and at 7 days intervals.	Foreman Competent person

Sec 3. **Suggestions**

Sec 3.1 **Suggestions – Guidelines**

Before

No loading information exchange form may leads to overloading of SWP during operation

Suggestion

To provide important loading condition and requirement to the practitioner for SWP design

Total Weight Under Suspension Mechanism *8mm Suspension Wire Unit Weight : 1meter = 0.25kg Power Supply Cable Unit Weight : 1 meter=0.30kg*

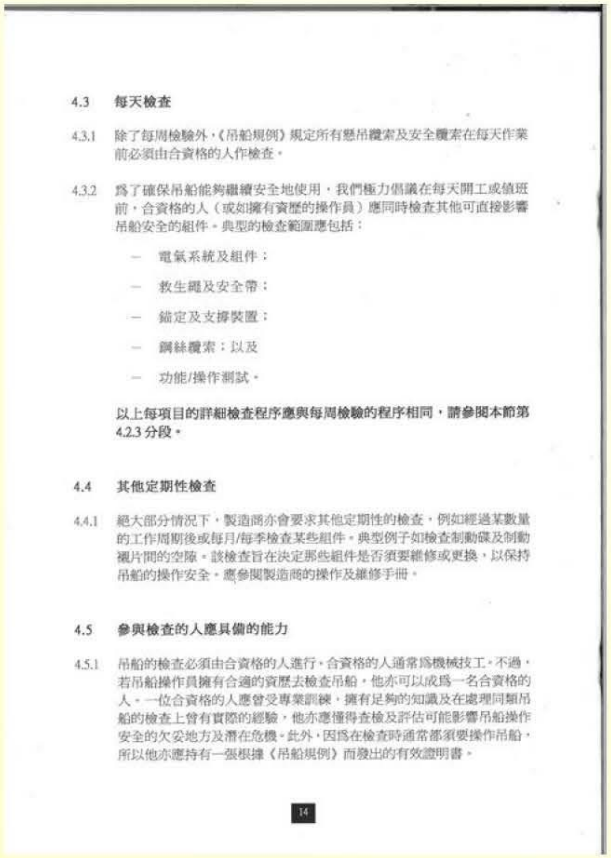
Size (metre)	Configuration	Side Fencing Plate	Bottom Plate	End Stirrup	Walk - Through Stirrup	Joining Legs	Total Cage Weight	Double Deck	LTD 630 Climbers	Control Box	Safety Locks	Wire Pulling Weights	Main Suspension Wires 70M	Secondary Suspension Wires 100M	Power Supply Cable 75M		Self Weight	WWL - workers + tools + material	Total Weight Under Suspension Mechanism based on WLL of climbers	Material based 2 workers 90kg each as per COP
0.5 M	0.5	20	8	46	0	0	74	148	96	14	10		35		23		326	674	*1000*	494
1.0 M	1	44	14	46	0	0	104	208	96	14	10		35		23		386	614	*1000*	434
1.5 M	1.5	60	22	46	0	0	128	256	96	14	10		35		23		434	566	*1000*	386
2.0 M	2	64	34	46	0	0	144	288	96	14	10		35		23		466	534	*1000*	354
2.5 M	2+ 0.5	84	42	46	0	8	180	360	96	14	10		35		23		538	462	*1000*	282
3.0 M	1+2	108	48	46	0	8	210	420	96	14	10		35		23		598	402	*1000*	222
3.5 M	2+1.5	124	56	46	0	8	234	468	96	14	10		35		23		646	354	*1000*	174
4.0 M	2+2	128	68	46	0	8	250	500	96	14	10		35		23		678	322	*1000*	142
4.5 M	2+2+0.5	148	76	46	0	16	286	572	96	14	10		35		23		750	250	*1000*	70
5.0 M	2+2+1	172	82	46	0	16	316	632	96	14	10		35		23		810	190	*1000*	10
5.5 M	2+2+1.5	188	90	46	0	16	340	680	96	14	10		35		23		858	142	*1000*	-38
6.0 M	2+2+2	192	102	46	0	16	356	712	96	14	10		35		23		890	110	*1000*	-70
6.5M	2+2+2+0.5	212	110	46	0	24	392	784	96	14	10		35		23		962	38	*1000*	-142
7.0 M	2+2+2+1	236	116	46	0	24	422	844	96	14	10		35		23		1022	-22	*1000*	-202
7.5M	2+2+2+1.5	252	124	46	0	24	446	892	96	14	10		35		23		1070	-70	*1000*	-250
8.0 M	2+2+2+2	256	136	46	46	24	508	1016	96	14	10		35		23		1191	-191	*1000*	-374
8.5M	2+2+2+2 +0.5	276	144	46	46	32	544	1088	96	14	10		35		23		1266	-266	*1000*	-446
9.0 M	2+2+2+2+ 1	300	150	46	46	32	574	1148	96	14	10		35		23		1326	-326	*1000*	-506
9.5M	2+2+2+2+ 1.5	316	158	46	46	32	598	1196	96	14	10		35		23		1374	-374	*1000*	-554
10.0 M	2+2+2+2 +2	320	170	46	46	32	614	1228	96	14	10		35		23		1406	-406	*1000*	-586

Before

Only rope checking is mandatory

Suggestion

Daily check - including function test



4.3 每天檢查

4.3.1 除了每周檢驗外，《吊船規例》規定所有懸吊纜索及安全纜索在每天作業前必須由合資格的人作檢查。

4.3.2 爲了確保吊船能夠繼續安全地使用，我們極力倡議在每天開工或值班前，合資格的人（或如擁有資歷的操作員）應同時檢查其他可直接影響吊船安全的組件。典型的檢查範圍應包括：

- 電氣系統及組件；
- 救生繩及安全帶；
- 錨定及支撐裝置；
- 鋼絲纜索；以及
- 功能/操作測試。

以上每項目的詳細檢查程序應與每周檢驗的程序相同，請參閱本節第4.2.3分段。

4.4 其他定期性檢查

4.4.1 絕大部分情況下，製造商亦會要求其他定期性的檢查，例如經過某數量的工作周期後或每月/每季檢查某些組件。典型例子如檢查制動碟及制動襯片間的空隙。該檢查旨在決定那些組件是否須要維修或更換，以保持吊船的操作安全。應參閱製造商的操作及維修手冊。

4.5 參與檢查的人應具備的能力

4.5.1 吊船的檢查必須由合資格的人進行。合資格的人通常爲機械技工。不過，若吊船操作員擁有合適的資歷去檢查吊船，他亦可以成爲一名合資格的人。一位合資格的人應曾受專業訓練，擁有足夠的知識及在處理同類吊船的檢查上曾有實際的經驗，他亦應懂得查檢及評估可能影響吊船操作安全的欠妥地方及潛在危機。此外，因爲在檢查時通常都須要操作吊船，所以他亦應持有一張根據《吊船規例》而發出的有效證明書。

Sec 3.2 Suggestions – Monitoring

Before

Overloading of SWP due to insufficient monitoring of loading condition during SWP operation

Suggestion

Front line staff pay more attention on overloading prevention

Before	Suggestion
Pulling weight missing	Pulling weight must be installed and check daily . Otherwise the safety lock and the safety wire will not function.

Sec 3.3 **Suggestions – Equipment**

Before

Single climber and safety lock system

Suggestion

Multi Climber operation eliminates the risk of safety lock failure and extra climber will boost up payload and also facilitate rescue in case of emergency

Before

Failure of single climber and safety lock lead to excessive tilting of SWP, also makes rescue difficult in case of emergency

Suggestion

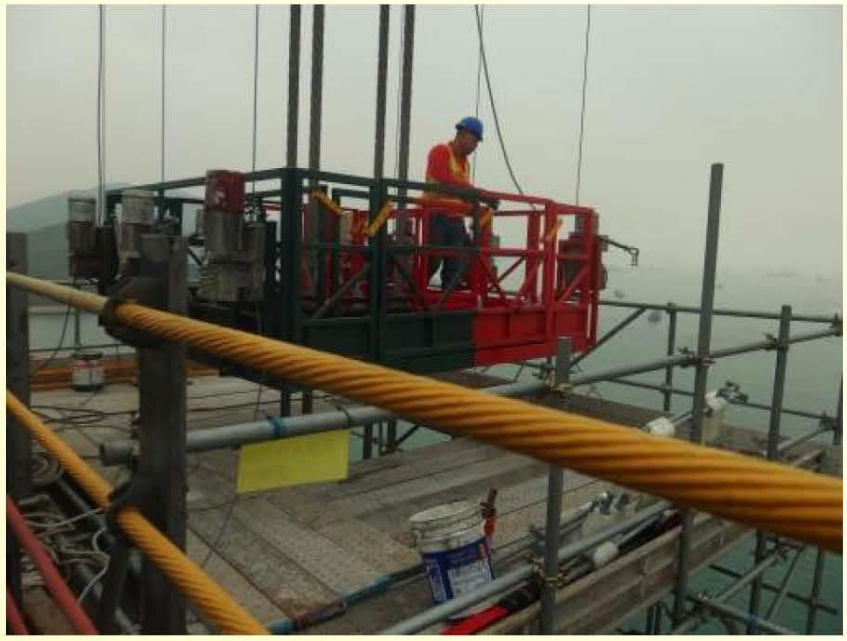
Multi Climbers & twin climbers operation eliminates the risk of safety lock failure and extra climber facilitate rescue in case of emergency

Before

Single climber & safety lock make it difficult to rescue in inaccessible or isolated locations i.e. end walls

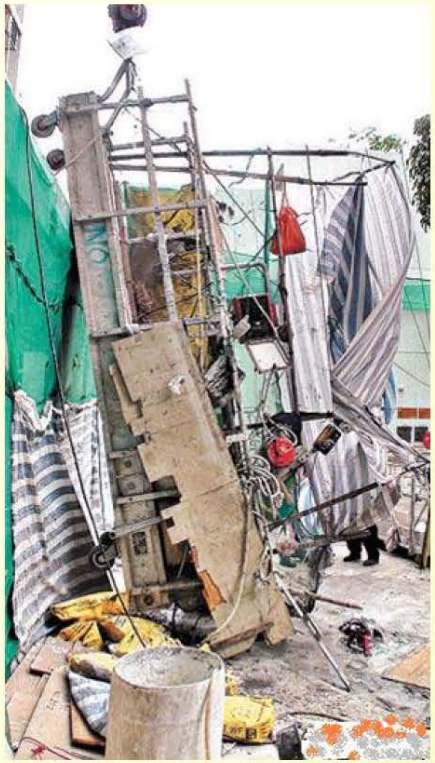
Suggestion

Multi Climbers – Facilitate rescue in case of climber and/or safety lock failure



Before

Single climber & safety lock system make it difficult to rescue in confined spaces in case of climber and/or safety lock failure



Suggestion

Multi Climbers facilitate rescue in case of emergency in confined spaces i.e. collapse of SWP , collapse of workers , failure of equipment