Subgrade – Capping Layer

29 March 2019

Sub-Base Course

1 April 2019

Base Course

6 April 2019

Date: 23 April – 29 April 2019

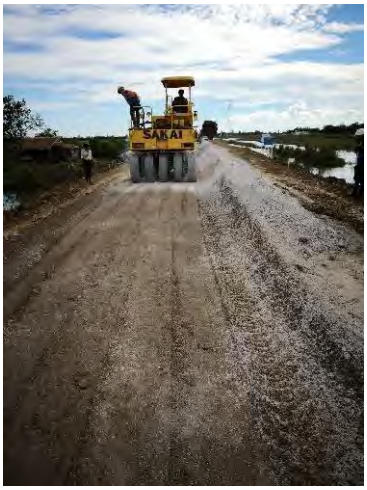
Subgrade – Capping Layer: Soil : Sand : Lime

60% : 40% : 6.9%

Date: 30 April – 6 May 2019

Sub-Base Course: Soil : Sand : River Shingle : Lime

15% : 15% : 70% : 6.9%



Date: 7 May – 12 May 2019

Base Course :	C/R (1"x2")	:	C/R (3/4")	:	C/R (1/2")	:	C/R (3/8")	:	Dust	:	Cement
	25%	:	20%	:	15%	:	10%	:	30%	:	4.6%

Date: 15 May – 18 May 2019

DBST Double Bituminous Surface Treatment Work

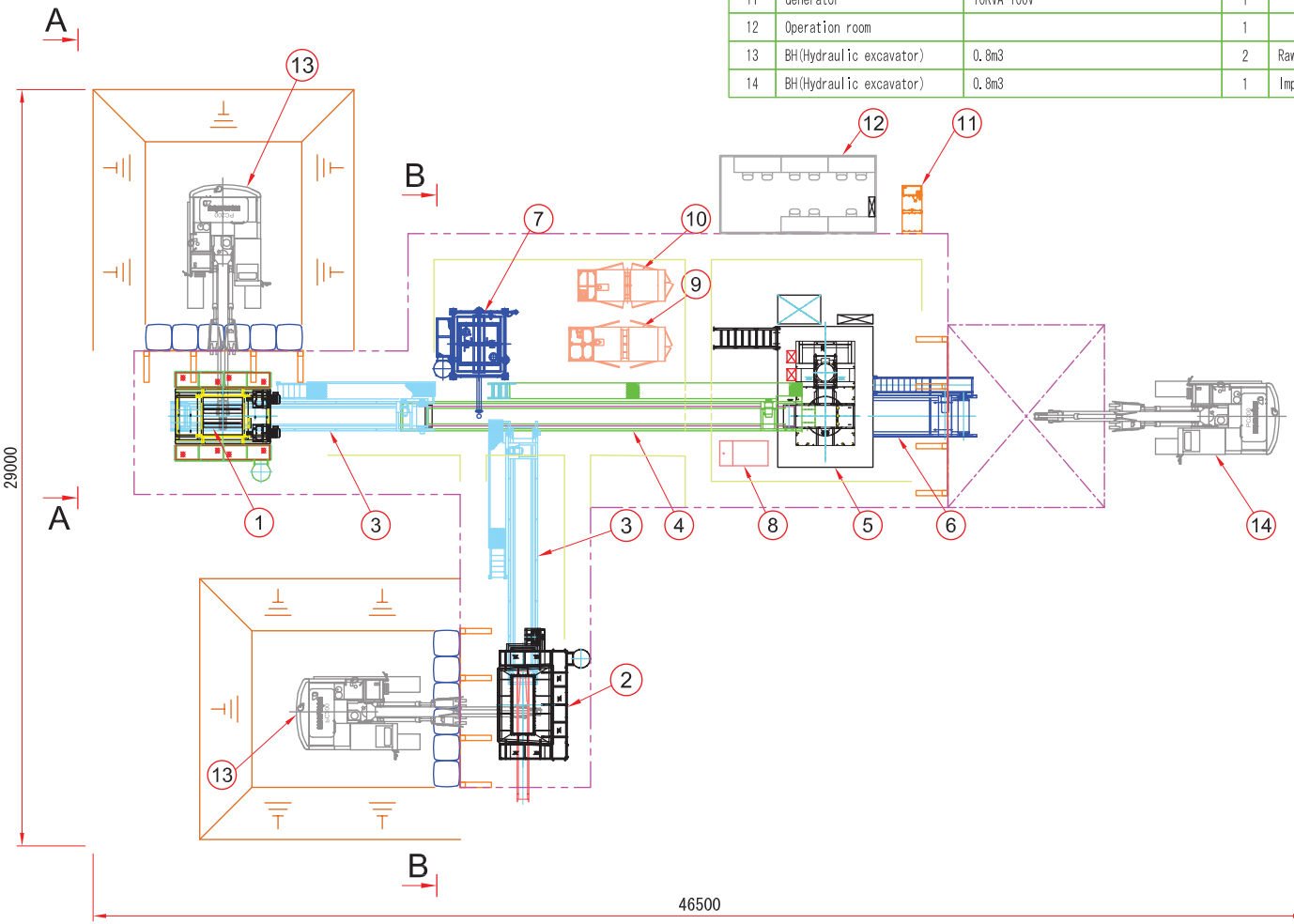
Date: 15 May – 18 May 2019

DBST Double Bituminous Surface Treatment Work

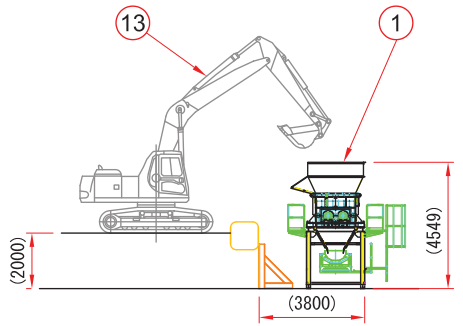
添付4：ツイスタープラント組立マニュアル

No.	Name	Specification	Q'ty	Remarks
8	Compressor	1.5m3/min	1	
9	Generator	150KVA 200V	1	
10	Generator	200KVA 400V	1	
11	Generator	10KVA 100V	1	
12	Operation room		1	
13	BH(Hydraulic excavator)	0.8m3	2	Raw material soil
14	BH(Hydraulic excavator)	0.8m3	1	Improved soil

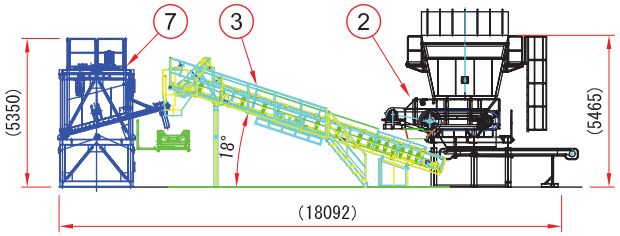
No.	Name	Specification	Q'ty	Remarks
1	WSF(Cohesive soil supplier)	2 axis 5m3 soil hopper	1	26.4kw
2	APF(Apron feeder)	W900mm×L2m 5m3 soil hopper	1	3.7kw
3	BC1, BC2(Conveyer belt)	W750mm×L9.2m 80m/min Measurement	2	5.5kw/unit
4	BC3(Converer belt)	W750mm×L14.75m 80m/min	1	7.5kw
5	TM1500(Twister)	φ1500mm	1	400V/110kw, 200V/6kw
6	BC4(Converer belt)	W1200mm×L7m 68m/min	1	5.5kw
7	SF(Quantitative feeder)	6m3/hr	1	2.2kw

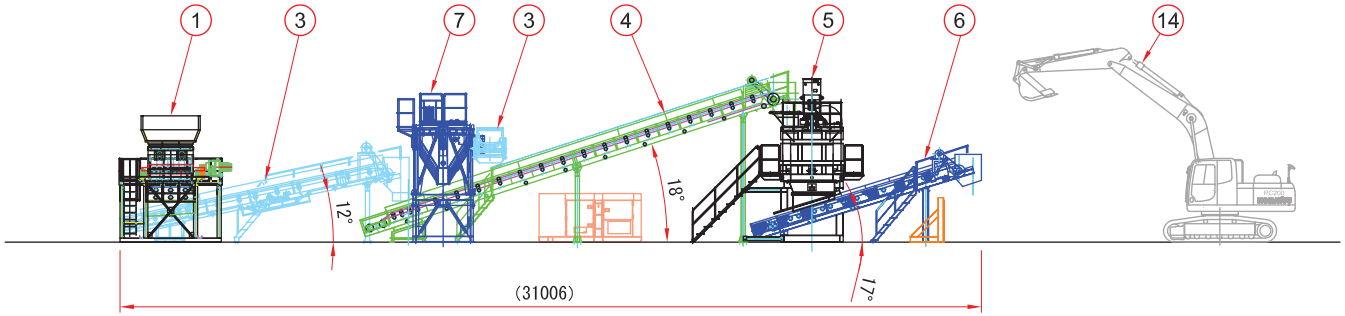


arrow view A-A



arrow view B-B





TITLE	Myanmar Project Twister Plant layout drawing		
MODEL	TM1500 2 materials 1 additive specification		
DRAWN	maui	APPROVED	
SCALE	1/200	DATE	12-SEP-2018

JDC CORPORATION

Standard Operating Procedures (Assembly)

Signature line of well-known meeting particip | Well-known meeting imple | Year | Moon | Day

Project	Myanmar Project	Description	Twister Plant Assembly	Work period	2018 / / ~ 2018 / /
		Company	JDC corporation (Yangon)	Author	Marui	Creation date	2018 / /

Company	Name	Company	Name

Construction system

MOC

JDC

Organization

Leader	
Signal	
Sling	
Crane	
Welding	

Qualified work

Mobile crane

Slinging safety training

Arc welding

Machine & tools

Rough terrain crane 25t, Welding machine, Slinging equipment, A set of tools

Personal Protective Equipment

Helmet, Safety boots, Protective gloves, Safety belt, Life jacket, Safety vest

Assembly process chart

【使用工具・機器】

Working load of sling wire

Across of wire		Cutting load	Single	Double 60°	Double 90°	Double 120°	Quintuple 60°	Quintuple 90°	Quintuple 120°
6mm	2分	1.81	0.30	0.57	0.51	0.4	1.1	1.0	0.85
8mm	2分5厘	3.22	0.53	1.0	0.91	0.7	2.0	1.8	1.5
9mm	3分	4.07	0.67	1.2	1.1	0.9	2.5	2.3	1.9
10mm	3分5厘	5.03	0.83	1.5	1.4	1.2	3.2	2.8	2.3
12mm	4分	7.24	1.20	2.2	2.0	1.6	4.5	4.0	3.3
14mm	4分5厘	9.85	1.63	3.1	2.7	2.3	6.2	5.5	4.6
16mm	5分	12.9	2.13	4.0	3.6	2.9	8.1	7.3	6.0
18mm	6分	16.3	2.68	5.1	4.6	3.7	10.2	9.2	7.6
20mm	6分5厘	20.1	3.34	6.3	5.6	4.6	12.7	11.3	9.4
22mm	7分	24.3	4.04	7.6	6.8	5.6	15.3	13.7	11.4
24mm	8分	28.9	4.81	9.1	8.2	6.6	18.3	16.4	13.5

Working load of nylon sling wire

使用荷重表 (吊り角度α=0°) の場合

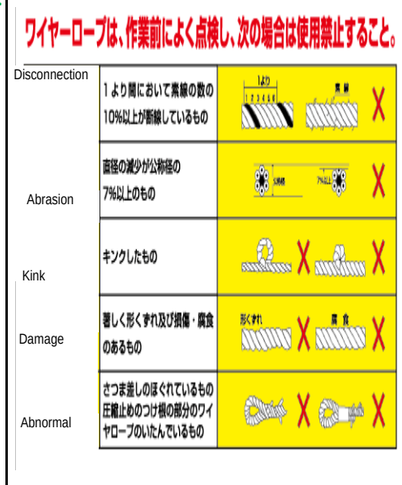
JIS表示			最大使用荷重	チョーク吊	バスケット吊 2点吊	バスケット吊 4点吊	破断荷重
			Wide				
	mm	t以下					kN以上
Ⅲ E-25	25	0.8	0.64	1.6	3.15	5.0	
Ⅲ E-50	50	1.6	1.28	3.15	6.4	10.0	
Ⅲ E-75	75	2.5	2.0	5.0	10.0	15.0	
Ⅲ E-100	100	3.2	2.56	6.4	12.8	20.0	
Ⅲ E-150	150	5.0	4.0	10.0	20.0	30.0	
Ⅲ E-200	200	6.3	5.0	12.5	25.0	40.0	

1t≒9.81kN

Name of the	Work procedures and Key points Key points of the work procedure	What are the hazards? [dangerous and harmful factors] What kind of risks are there?	Risk Rating Severity a	Frequency b	Risk a × b	Precaution / Action taken [removal or reduction measures of hazards] in order to reduce risk Eliminate or mitigate hazards
	1. Preparation work	- Construction work content on-site, off-limits area				- Make sure they coordinate well with other activities at construction work site.
	To participate in the morning briefing.	**Work content of other constructions,**				
	Join the morning assembly	**Lack of public knowledge of the no-entry area**				**Check the details of the work site as a whole and do adjustment with other works.**
	Perform a risk prediction activities.	- Health state, disturbance of clothing				- Inspect physical condition of clothing.
	Do risk prediction activities	**Health condition, clothing disorder**				
	Carry out the start-up inspection.	- Work, danger points, lack of procedure	1	3	B	**Check the physical condition of clothing.**
	Perform pre-start inspection	**Inadequate knowledge of work content,**				
	Perform an explicit work area.	**points of danger, procedures**	3	1	B	- Actively participate in KY, increase understanding of the work contents.
	Specify the work area clearly	- Work by unqualified person				**Actively participate in KY and deepen understanding towards work contents.**
	2. Main work	**Work by unqualified person**				
		- Laceration of the finger during inspection works				- Assign right man in the right place, check the qualification's certificate.
		It lacerated fingers during inspection work				**Check the credentials and assign right people for the right place.**
		- Caught in during heavy machine inspection				
		Pierced during heavy machine inspection,				- Wear personal protective equipment during inspection.
		caught in				**Wear personal protective equipment during inspection**
		- Vehicles, contact with heavy equipment				- The person in charge to carry out inspection on the equipment based on inspection schedule.
		Contact with vehicles and heavy equipment				**The person in charge examines the equipment based on the inspection schedule.**
	[Common]					
	1) Arrange a rough terrain crane.	- Topple of the crane	3	1	B	- Check the safety of working perimeter.
	Arrange a rough terrain crane	**Fall of a rough terrain crane**				- Inspection on the outrigger installation scaffold.
		- Rough terrain crane fails at the time of turning	3	1	B	- To check the full overhang of the outriggers.
						Confirm surrounding safety and work
						Confirmation and inspection of the outrigger installation scaffold surely
						Confirm the outrigger's complete overhang

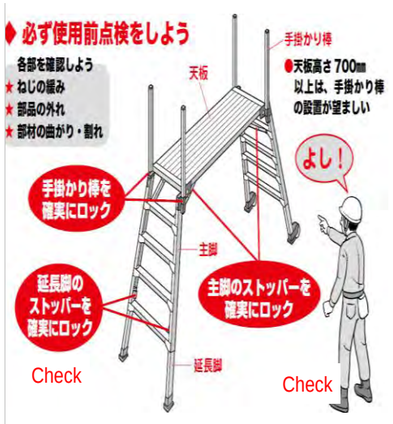
Attention of sling wire

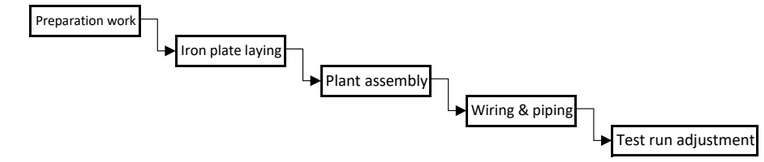
Check well before work



Portable work table

Check well before work



work is Less operation	2) To guide cargo truck. **Guide cargo truck.** 3) Unloading carried out. **Perform unloading.**	**Rough terrain crane fails at the turning time** - Clear guidance to the vehicle **Run over by a guided vehicle** - Falling objects. **Sandwiched by falling object** - Sling is used to prevent material from crashing **Seat rings, to prevent crash when unloading** - Worker fall from the truck. **Worker fall from the truck.** - Provisional material is damaged during unloading **Temporary material is damaged.**	3 3 3 2 3	1 1 1 1 1	B B B C B	Unauthorized personnel is prohibited from entering the turning range. - Clear guidance given to the driver. - Take measures to prevent the wheel of stopped vehicles from escape. - Perform the start-up inspection on sling equipment. - Sling is use during unloading. - Using of safety belt during work at height. - Use a portable workbench for loading truck. - Signage is installed at loading space **Prohibition of unauthorized person from entering the turning range** **Clear guidance given at the right position where the driver can see** **Take measures to prevent the wheel of stopped vehicles from escape** **Pre-start inspection of sling tool** **Use of sling during unloading** **Please use safety belts during work at height** **Use the portable workbench for loading trucks** **Signage is installed at working area.**	【Construction flow】  ★ evaluation criteria and evaluation point of the risk assessment a: The severity of the risk 3: Extremely serious (disaster with the death and disab 2: Critical (lost-time injuries = off 4 or more days of the 1: Minor (Fukyu disaster = disaster of less than closed 4 b: The frequency of risk 3: Pretty occur (also occur about once six months) 2: Sometimes happen (occur about once a year) 1: little place (which occurs about once in 5 years) Evaluation of risk (a × b) → A: 9 ~ 6 (high risk), B: 4 ~ 3 (medium risk), C: 2 ~ 1 (low risk)

Standard Operating Procedures (Assembly)

Signature line of well-known meeting particip | Well-known meeting imple | Year | Moon | Day

Project	Myanmar Project	Description	Twister Plant Assembly	Work period	2018 / / ~ 2018 / /
		Company	JDC corporation (Yangon)	Author	Marui	Creation date	2018 / /

Company	Name	Company	Name

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Sling	
Crane	
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Mobile crane

Slinging safety training

Arc welding

Machine & tools

Rough terrain crane 25t, Welding machine, Slinging equipment, A set of tools

Protective equipment

Helmet, Safety boots, Protective gloves, Safety belt, Life jacket, Safety vest

Assembly process chart

【使用工具・機器】

Working load of sling wire

Across of wire の直径		Cutting load 玉	Single 垂直安全荷重	Double 2本吊り 60°	Double 2本吊り 90°	Double 2本吊り 120°	Quintuple 5本吊り 60°	Quintuple 5本吊り 90°	Quintuple 5本吊り 120°
6mm	2分	1.81	0.30	0.57	0.51	0.4	1.1	1.0	0.85
8mm	2.5分/三重	3.22	0.53	1.0	0.91	0.7	2.0	1.8	1.5
9mm	3分	4.07	0.67	1.2	1.1	0.9	2.5	2.3	1.9
10mm	3.5分/三重	5.03	0.83	1.5	1.4	1.2	3.2	2.8	2.3
12mm	4分	7.24	1.20	2.2	2.0	1.6	4.5	4.0	3.3
14mm	4.5分/四重	9.85	1.63	3.1	2.7	2.3	6.2	5.5	4.6
16mm	5分	12.9	2.13	4.0	3.6	2.9	8.1	7.3	6.0
18mm	6分	18.3	2.69	5.1	4.8	3.7	10.2	9.2	7.6
20mm	6.5分/五重	20.1	3.34	6.3	5.6	4.6	12.7	11.3	9.4
22mm	7分	24.3	4.04	7.6	6.8	5.6	15.3	13.7	11.4
24mm	8分	28.9	4.81	9.1	8.2	6.8	18.3	16.4	13.5

Working load of nylon sling wire

使用荷重表 (吊り角度α=0) の場合

JIS表示	Wide	III E形(両端アイ形) 最大使用荷重 kg以下	チョーク吊	バスケット吊 2点吊	バスケット吊 4点吊	破断荷重 kN以上
III E-25	25	0.8	0.64	1.6	3.15	50
III E-50	50	1.6	1.28	3.15	6.4	100
III E-75	75	2.5	2.0	5.0	10.0	150
III E-100	100	3.2	2.56	6.4	12.8	200
III E-150	150	5.0	4.0	10.0	20.0	300
III E-200	200	6.3	5.0	12.5	25.0	400

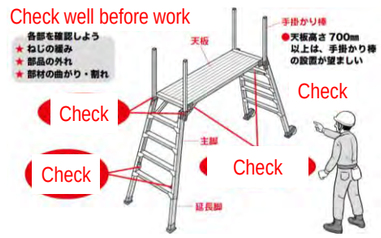
1kN≒0.1tf

Attention of sling wire

Check well before work

Disconnectio	1より間において素線の数の10%以上が断線しているもの
Abrasion	直径の減少が公称径の7%以上のもの
Kink	キンクしたもの
Damage	著しく形くずれ及び損傷・腐食のあるもの
Abnormal	さつま並しのほぐれているもの 圧縮止めのつけ根の部分のワイヤロープのいたんでいるもの

Portable work table



【Construction flow】

Preparation work → Iron plate laying → Plant assembly → Wiring & piping → Test run adjustment

Key points of the work procedures and work activities	Whether or not there is any hazards [danger and harmful factors]	Severity a	Frequency b	Risk a × b	Precaution / Action taken [removal or reduction measures of hazards] in order to reduce risk Eliminate or mitigate hazards
1. Preparation work					
To participate in the morning briefing.	- Construction work on-site, off-limits area				- Make sure worker well coordinatie with other activities.
	- Health state, disturbance of clothing				- Inspect physical condition of clothing, correct clothing disturbance.
Perform a risk prediction activities.	- Work, danger points, lack of procedure				- Actively participate in KY, raise the level of understanding of the work.
	- Work by unqualified person				- Strive right man in the right place, check the qualification's certificate.
Carry out the start-up inspection.	- Laceration of the finger during inspection works	1	3	B	- Wear personal protective equipment (PPE) during inspection.
	- Caught in during heavy machinery nspection				- The person in charge, carried out an inspection of the equipment based on the inspection table.
Perform an explicit work area.	- Vehicles, contact with heavy equipment	3	1	B	- Check the perimeter of safety to work.
2. Main work					
[Common]					
1) Arrange a rough terrain crane.	- Topple of the crane	3	1	B	- Inspection and confirmation of the outrigger installation scaffold.
	- Rough terrain crane fails at the time of turning				- To check the full overhang of the outriggers.
		3	1	B	- Unauthorized personnel is prohibited from entering the turning range.
2) To guide the cargo truck.	- Clear guidance to the vehicle	3	1	B	- Clear guidance given to the driver.
					- Take measures to prevent the wheel of stopped vehicles from escape.
3) Unloading carried out.	- Falling objects	3	1	B	- Perform the start-up inspection on slinging equipment.
					- Sling is use during lifting.
	- Sling is used to prevent material from crashing	3	1	B	- Using of safety belt during work at height.
	- Worker fall from the loading platform.	2	1	C	- Use a portable workbench for loading truck.
	- Provisional material is damaged during unloading	3	1	B	- Signage is installed at loading space

The name of the work is Re

★ evaluation criteria and evaluation point of the risk assessment

a: The severity of the risk

3: Extremely serious (disaster with the death and disab
2: Critical (lost-time injuries = off 4 or more days of the
1: Minor (Fukyu disaster = disaster of less than closed

b: The frequency of risk

3: Pretty occur (also occur about once six months)
2: Sometimes happen (occur about once a year)
1: Little place (which occurs about once in 5 years)

Evaluation of risk (a × b) → A: 9 ~ 6 (high risk), B: 4 ~ 3 (medium risk),
C: 2 ~ 1 (low risk)

Standard Operating Procedures (Assembly)

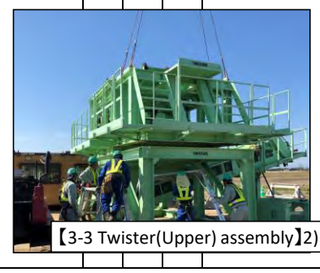
The name of the work is Re

Key points of the work procedures and work activities	Whether or not there is any hazards [danger and harmful factors]	Risk Rating: Severity a	Frequency b	Risk a × b	Precaution / Action taken [removal or reduction measures of hazards] in order to reduce risk Eliminate or mitigate hazards
[1 Steel plate laying]					
1) Use sling to spread steel plate. (If steel plate is used)	- Body injury during handling of the steel plate.	2	2	B	- Guidance and signal is given clearly to the operator
2) Lift to a predetermined position.	- Instability when laying the steel plate due to the wind load.	2	1	C	- Sling is use during lifting.
3) Lay the steel plate	- Unintentionally movement of steel plate during placement.	3	1	B	- The direction in which the fall of the steel plate cannot be determined.
[2 Positioning of TM PLANT]					
1) Mark the plant position on the concrete foundation by paint and perform level survey	- Stumble to fall	1	1	C	- Make sure the safety of the feet.
[3-1 Twister (Lower) assembly]					
1) Adjust the level of the plant marking position, and install the lower frame part	- Falling object.	3	1	B	- Secure the load by hanging it to prevent falling.
[3-2 BC4 assembly]					
1) Adjust the level of the marking position, the front footing is set up accoding the fix gradient, and fall prevention measures is taken.	- Finger injury during level adjustment	2	2	B	- Do not put a finger under the member.
	· Falling of the Twister members.	3	1	B	- Practice the fall prevention measures.
2) Gradient of the BC4 Body is adjusted by using chain block	- Falling object.	3	1	B	- Secure the load by hanging it to prevent falling.
3) The trestle footings is adjusted and bolted into position.	- Lifting object hit surrounding material.	1	3	B	- Sling is use during lifting.
	- Worker fall from a height	3	1	B	- To ensure the use of safety belts.
	- Finger injury during handling members.	2	2	B	- Make sure the safety of the hands.
[3-3 Twister (Upper) assembly]					
1) Handrail and corridor are installed to the upper unit.	- Falling object.	3	1	B	- Sling is use during lifting.
2) The base frame is connected to the to the Lower part of the Twister. Make sure to maintain the safety work radius since the top part is heavy.	- Falling object.	3	1	B	- Secure the load by hanging it to prevent falling.
	- Finger injury during handling members.	2	2	B	- Guidance and signal is given clearly to the operator
3) Elevating stair, chute and motor are installed.	- Finger injury during djustment of bolt hole and member	2	1	C	- Handle the bolt hole with precaution.

【3-1 Twister(Lower) assembly】

【3-2 BC4 assembly】

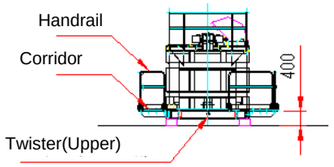
【3-3 Twister(Upper) assembly】1)

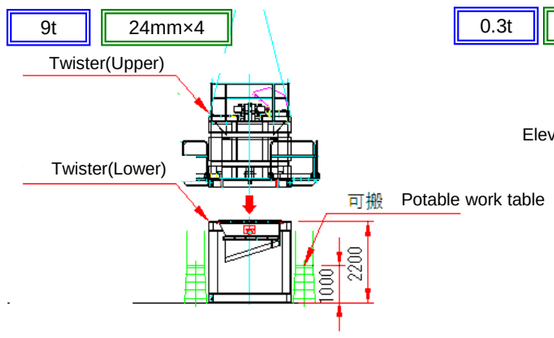


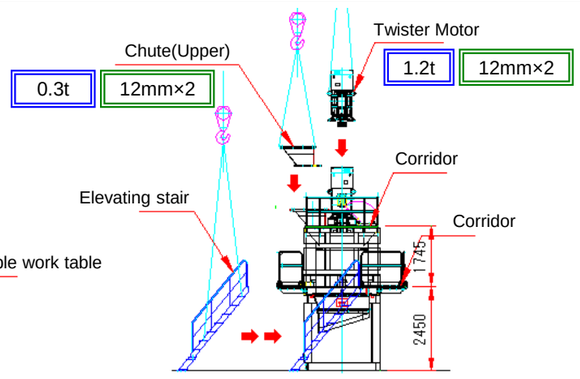
【3-3 Twister(Upper) assembly】2)

【3-3 Twister assembly】3)

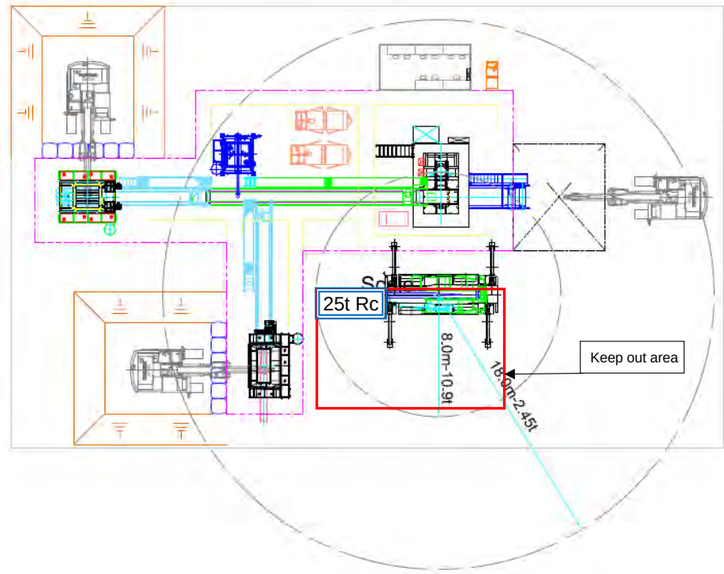
【3-3 Twister(Upper) assembly】



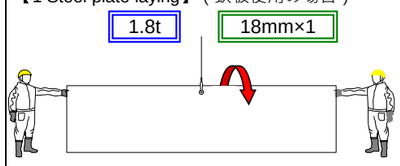




Assembly process chart

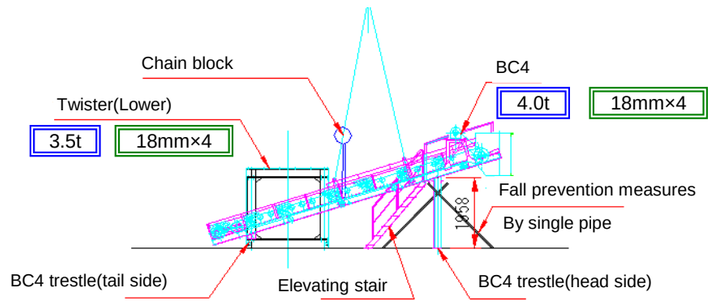


【1 Steel plate laying】（鉄板使用の場合）



※ Do not stand in front of the iron plate

【3-1 Twister(Lower) assembly】
【3-2 BC4 assembly】



★ evaluation criteria and evaluation point of the risk assessment

a: The severity of the risk — b: The frequency of risk

3: Extremely serious (disaster with the death and disab — 3: Pretty occur (also occur about once six months)

2: Critical (lost-time injuries = off 4 or more days of the — 2: Sometimes happen (occur about once a year)

1: Minor (Fukyu disaster = disaster of less than closed 4 — 1: Little place (which occurs about once in 5 years)

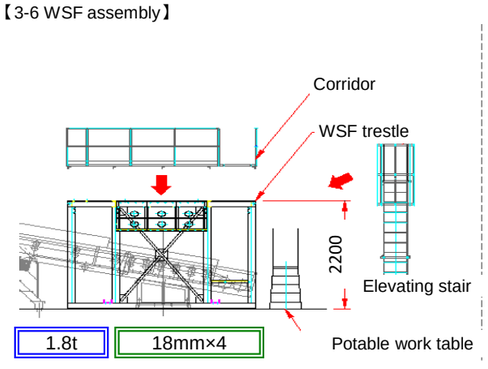
Evaluation of risk (a × b) → A: 9 ~ 6 (high risk), B: 4 ~ 3 (medium risk),
C: 2 ~ 1 (low risk)

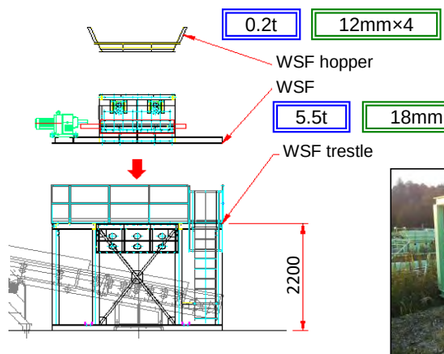
Standard Operating Procedures (Assembly)

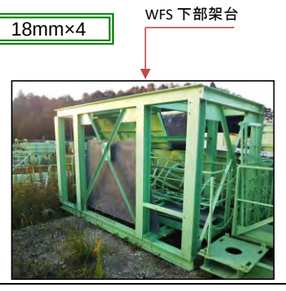
The name of the work is Re

Key points of the work procedures and work activities	Whether or not there is any hazards [danger and harmful factors]	Risk Rating Severity a	Frequency b	Risk a × b	Precaution / Action taken [removal or reduction measures of hazards] in order to reduce risk **Eliminate or mitigate hazards**
[3-4 BC3 assembly]					
1) To install the assembly stand.	- Falling object.	3	1	B	- Secure the load by hanging it to prevent falling.
2) Temporarily placed the BC3 on separated assembly stand.	- Finger injury during handling members.	2	2	B	- Guidance and signal is given clearly to the operator
3) Hook on the BC3 head side and bolt to the intermediate frame. (Applicable to the tail side as well)	- Finger injury during handling members.	2	2	B	- Guidance and signal is given clearly to the operator
	- Finger injury during djustment of bolt hole and member	2	1	C	- Handle the bolt hole with precaution.
4) Install the BC trestle and elevating stair.	- Finger injury during handling members.	2	2	B	- To ensure safety of the hand.
5) Adjust the level of the marking position, install the front legs, intermediate leg, and tail stand. Practice fall prevention measures to prevent falling of the members.	- Finger injury during level adjustment.	2	2	B	- Do not put a finger under the member.
	- Falling of Twister member.	3	1	B	- To practice the fall prevention measures.
6) Adjust the gradient of the main body by using chain block.	- Falling object.	3	1	B	- Secure the load by hanging it to prevent falling.
7) Each legs are adjusted and bolted into position.	- Lifting object hit surrounding material.	1	3	B	- Sling is use during lifting.
	- Worker fall from height	3	1	B	- To ensure the use of safety belts.
	- Finger injury during handling members.	2	2	B	- To ensure safety of the hand.
[3-5 BC1,2 assembly]					
1) Adjust the level of the marking position, install the front legs. Practice fall prevention measures to prevent falling of the members.	- Finger injury during level adjustment.	2	2	B	- Do not put a finger under the member.
	- Member fall and caught in.	3	1	B	- To practice the fall prevention measures.
	- Falling object.	3	1	B	- Secure the load by hanging it to prevent falling.
2) Adjust the gradient of the main body by using chain block.	- Lifting object hit surrounding material.	1	3	B	- Sling is use during lifting.
3) Each legs are adjusted and bolted into position.	- Worker fall from height	3	1	B	- To ensure the use of safety belts.
	- Finger injury during handling members.	2	2	B	- To ensure safety of the hand.
[3-6 WSF assembly]					
1) Adjust the level of marking position, install the trestle.	- Finger injury during level adjustment.	2	2	B	- Do not put a finger under the member.
2) Install the elevatiing stair, corridor and handrails to the stand.	- Finger injury during handling members.	2	1	C	- To ensure safety of the hand.
	- Worker fall from height	3	1	B	- To work using a portable work bench.
3) Base frame of the clay supply machine is adjusted and bolted to the position.	- Finger injury during djustment of bolt hole and member	1	2	C	- Handle the bolt hole with precaution.
	- Finger injury during handling members.	2	2	B	- Guidance and signal is given clearly to the operator
4) The sediment hopper is installed accordingly.	- Finger injury during handling members.	2	2	B	- To ensure safety of the hand.
	- Worker fall from height	3	1	B	- To ensure the use of safety belts.

【3-6 WSF assembly】

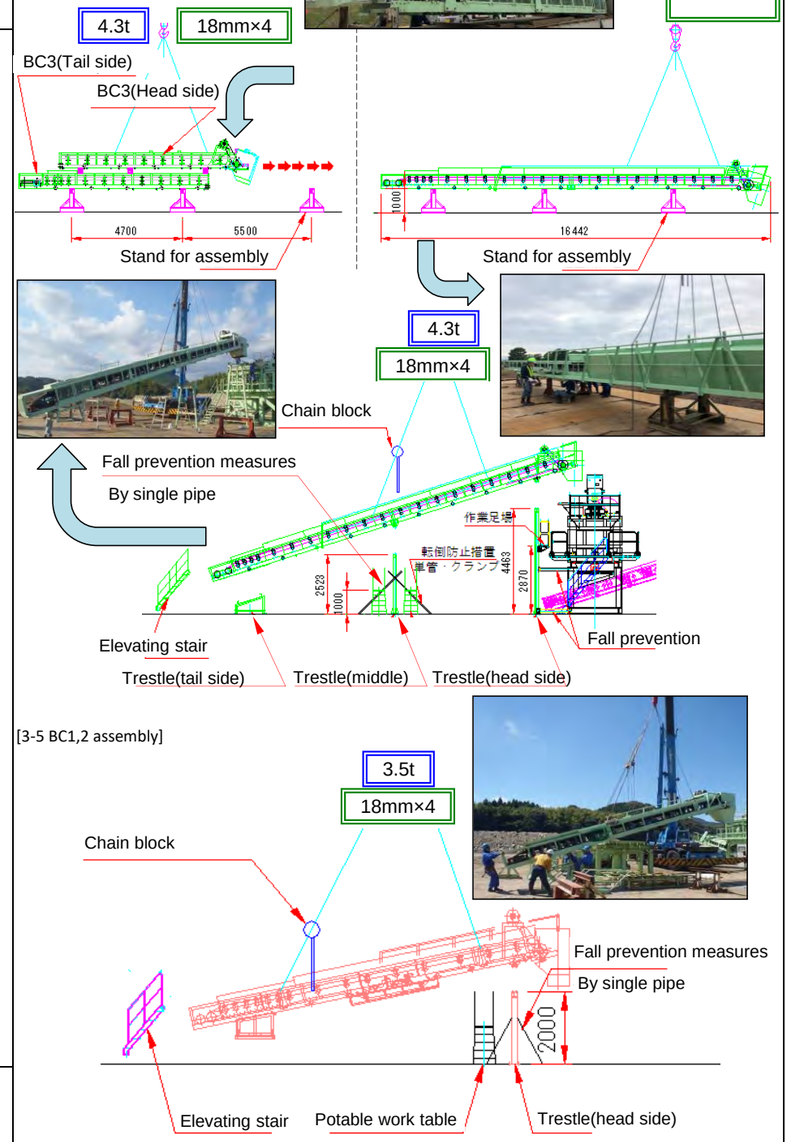






Assembly process chart

[3-4 BC3 assembly]



[3-5 BC1,2 assembly]

★ evaluation criteria and evaluation point of the risk assessment

a: The severity of the risk

3: Extremely serious (disaster with the death and disab
2: Critical (lost-time injuries = off 4 or more days of the
1: Minor (Fukyu disaster = disaster of less than closed

b: The frequency of risk

3: Pretty occur (also occur about once six months)
2: Sometimes happen (occur about once a year)
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Evaluation of risk (a × b) → A: 9 ~ 6 (high risk), B: 4 ~ 3 (medium risk),
C: 2 ~ 1 (low risk)

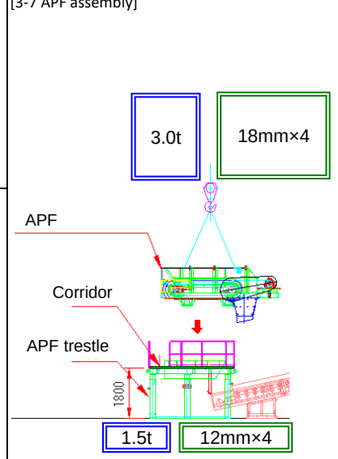
Standard Operating Procedures (Assembly)

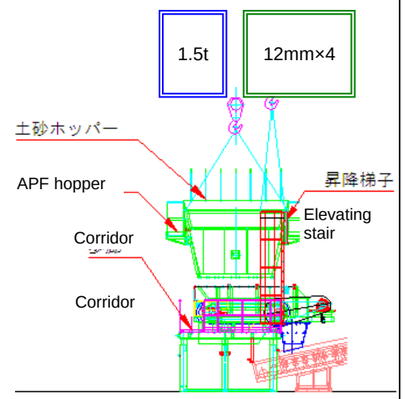
The name of the work is Re

Key points of the work procedures and work	Whether or not there is any hazards [danger and harmful factors]	Risk Rating Severity a	Frequency b	Risk a × b	Precaution / Action taken [removal or reduction measures of hazards] in order to reduce risk **Eliminate or mitigate hazards**
[3-7 APF assembly]					
1) Adjust the level of marking position, install the APF trestle.	- Finger injury during level adjustment.	2	2	B	- Do not put a finger under the member.
2) Corridor, handrails and APF are installed on trestle.	- Finger injury during handling members.	1	2	C	- To ensure safety of the hand.
3) Join the base frame and bolt APF hopper together on the trestle.	- Finger injury during djustment of bolt hole and member - Finger injury during handling members.	2 2	1 2	C B	- Handle the bolt hole with precaution. - To ensure safety of the hand.
4) Elevating stair and corridor are installed on sediment hopper.	- Finger injury during handling members.	1	2	C	- To ensure safety of the hand.
5) Sand and soil hopper and apron feeder are bolted join.	- Falling object. - Finger injury during handling members.	3 2	1 2	B B	- Secure the load by hanging it to prevent falling. - To ensure safety of the hand.
[3-8 SF (Quantitative feeder)]					
1) Adjust the level of position, install the gantry.	- Finger injury during level adjustment.	2	2	B	- Do not put a finger under the member.
2) Elevating stair is installed to the gantry.	- Finger injury during handling members.	1	2	C	- To ensure safety of the hand.
3) The upper SF unit is bolted to the lower mount.	- Finger injury during djustment of bolt hole and member - Finger injury during handling members.	2 2	1 2	C B	- Handle the bolt hole with precaution. - To ensure safety of the hand.
4) Install walkway and handrail on the SF hopper section.	- Finger injury during handling members.	1	2	C	- To ensure safety of the hand.
[3-9 Silo assembly (unused planned)]					
1) Laying the steel plates.	- Injury during time of laying steel plate.	3	1	B	- Sling is used during lifting and placement of steel plate.
2) Placing of silo. (In horizontal stationary state)	- Falling object.	3	1	B	- Aware of the surrounding people and objects.
3) To install and erect the silo. (Check the level of silo.)	- Crashing when lifting the silo.	3	1	B	- Always use safety block during lifting works.
4) Install a fall prevention cable or life line.	- Worker fall from height	2	1	C	- Adjust or reduce activities required work-at-height.
[3-10 Install generator]					
1) Generator is assembled.	- Feet slipped during the assembly of generator.	2	2	B	- Practice three-point contact when move up and down and aware of feet.
2) Generator is installed at the fixed position.	- Falling object. - Lifiting generator may hit surrounding worker and machinery.	3 3	1 1	B B	- Aware of the surrounding people and objects. - Sling is used to secure the lifting object and clear signal is given to operator.
[3-11 Fix TM PLANT]					
1) Each equipment are fixed with anchor bolts on concrete foundation so that the plant footings and platforms are not dislodge. *In case of steel plate is using, fix the steel plate in position.	- Drilled piece is scattered to the eyes during drilling works. - Fire casued by sparks are produced. - Damage to the eyes.	1 2 2	1 1 2	C C B	- To ensure the wearing of personal protective equipment (PPE) - Prepare fire-fighting equipment and remove the combustible materials. - To ensure the use of welding face shield.

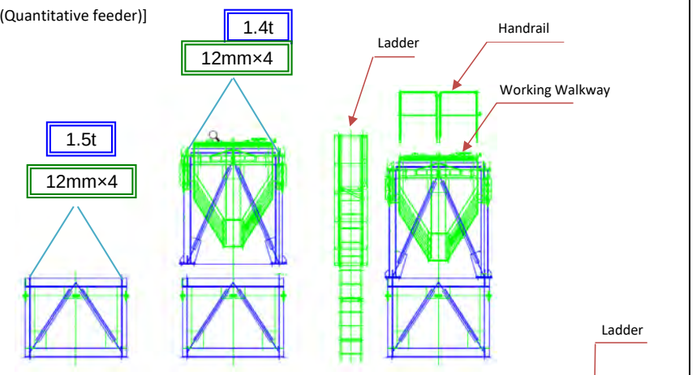
Assembly process chart

[3-7 APF assembly]

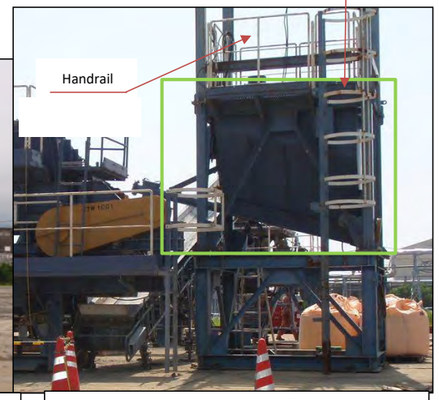




[3-8 SF (Quantitative feeder)]



[3-9 Silo assembly]



【3-8 SF(Quantitative feeder)】Bottom part

【3-8 SF(Quantitative feeder)】SF Upper part

【3-7 APF assembly】

【3-7 APF assembly】

【3-7 APF assembly】

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Standard Operating Procedures (Assembly)

Key points of the work procedures and work	Whether or not there is any hazards [danger and harmful factors]	Risk Rating: Severity a	Risk Rating: Frequency b	Risk Rating: Risk a × b	Precaution / Action taken [removal or reduction measures of hazards] in order to reduce risk **Eliminate or mitigate hazards**
[4 Wiring]					
1) Install the control panel and distribution board.	-Waist injury durign installation works.	2	1	C	- Pratice buddy system during works.
	- Hands and finger injury during installation works.	2	1	C	- Wear protective gloves to work.
2) Connect wire to plant power line and control line.	- Worker fall from height.	3	1	B	- Use safety belt during work at height.
(Tighten securely to avoid loose terminal)					- Use portable work bench when carry out wiring works.
[5 Test run adjustment]					
1) To start the generator.	- Equipment fail to function due to voltage shortage	1	1	C	- Make sure the breaker is OFF before starting.
(Check the voltage and frequency control)					
2) Switch on the breaker.	- Equipment suddenly runs and body injury when get caught in.	2	1	C	- Stop the breaker during incident happened.
3) Perform commissioning of equipment alone.	- Body injury due to caught into equipment.	2	1	C	- Commisioning start after signal is given.
(Check the motor rotation direction)	- Damage of equipment due to imporper operation.				(Radio, siren activation)
4) Check and adjust the operation of the safety device.	- Body injury due to caught into equipment.	2	1	C	- Commisioning start after signal is given.
(Emergency stop button, rope pull switch)					(Radio, siren activation)
5) Check and adjust the operation of each device by remote control.	- Body injury due to caught into equipment.	2	1	C	- Commisioning start after signal is given. (Radio, siren activation)
6) Perform adjustment on interlocking operation.	- Body injury due to caught into equipment.	2	1	C	- Commisioning start after signal is given. (Radio, siren activation)

Assembly process chart

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