

# Retrofit of Cable Reel Drum (CRD) to IGUS Chain Flex for Coal Handling System



**PT CIREBON POWER SERVICES**

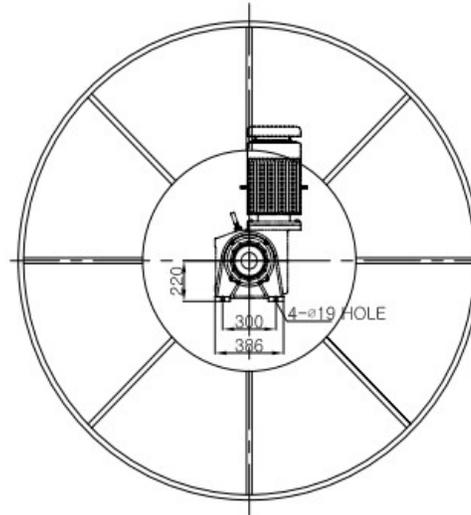
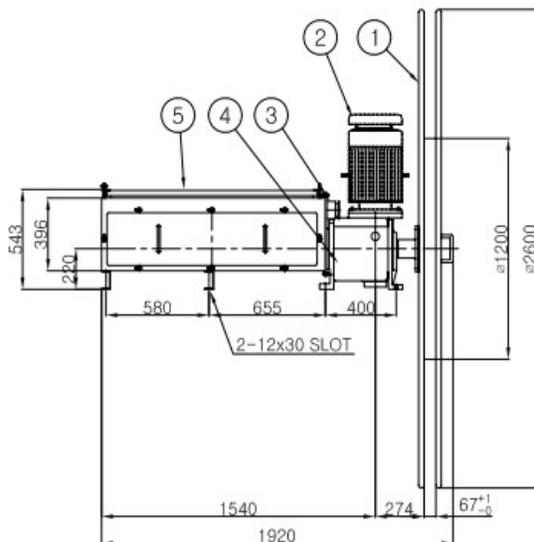
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# Background

Supply of electrical power and control to the ship unloader & Stacker Reclaimer currently using cable reel drum (CRD),



## Components:

1. Drum
2. Motor
3. Cable Gland
4. Reducer Box
5. Slip Ring Box

## Specifications:

1. Cable : 2.5sq\*50c + 4sq\*16c + 6sq\*4c – R  
Size  $\varnothing 56.5$  Weight: 4.7 Kg/m
2. Winding Length : 60m (120m of center supply)
3. Winding Speed: 15m/min (Max)
4. Power source: 380 VAC 50Hz 3 Phase
5. Winding Torque :29Kg-m



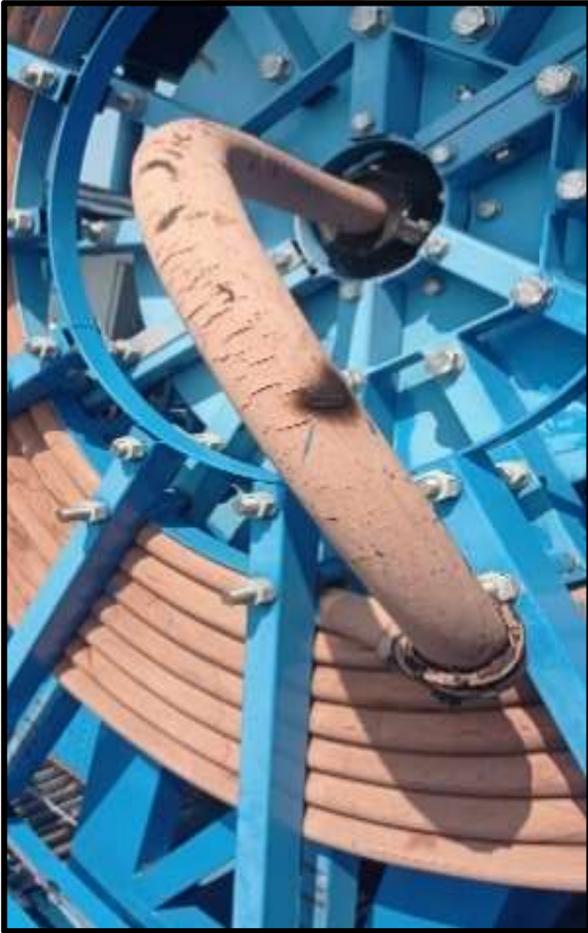
## *Problem*

Since COD and after several years of operation we have several problems, i.e.;

- ❑ Wear and tear, cable reels are subjected to wear over time, especially in harsh environment condition
- ❑ Tension and twisting, cable have experience with tension and twisting issues, effecting their lifespan and short circuit during operation
- ❑ Slack and stuck, cable experience slack and stuck with support of cable tray, and during travelling make cable damage and short circuit



# Problem



Cable Wear and Crack



Cable Twisted



Control switch problem



# *Problem*



Cable Slack and out from cable tray



Cable Stuck with support of cable tray



# Problem



Cable reeling outside drum and damaged



Cable damaged caused reeling outside drum



Cable damaged caused stuck



# Problem

## Historical CRD problem on the GTSU

| No | Work Order     | Problem  | Root Cause      |
|----|----------------|--|-----------------|
| 1  | WK130507.0059  | GTSU02: Check and Rectify CRD Fault When Travel to Centre Point    | Cable slack     |
| 2  | WK140823.0004  | Rectify Cable CRD Fault When Pass the Middle Point                 | Cable slack     |
| 3  | WK150818.0005  | GTSU02: Rectify CRD cable due to loose And Limit Swatch not active | Cable slack     |
| 4  | WK170408.0018  | GTSU 01: Rectify CRD Due Fault Active When Position On Middle      | Cable slack     |
| 5  | WK190512.0011  | GTSU02: Rectify CRD due to can't roll-up                           | Cable slack     |
| 6  | WK190926.0008  | Please Check CRD Fault On Middle Position at GTSU02                | Cable slack     |
| 7  | WK130720.0004  | GTSU01: Rectify CRD Over Temperature                               | Over tension    |
| 8  | WK180514.0315  | GTSU 02: Need Rectify CRD Often Fault When Gantry Increasing Speed | Over tension    |
| 9  | WK200415.0013  | GTSU 02: Please Install Cover for Power Motor CRD due to loose     | Bolt loosen     |
| 10 | WK210419.65992 | GTSU 02: CRD Often Slack   | Cable slack     |
| 11 | WK211221.18351 | GTSU 01: CB Motor CRD broken                                       | Panel vibration |
| 12 | WK221212.34078 | GTSU 02: CRD Often Fault Active                                    | Cable slack     |



# Problem

## Historical CRD problem on the Stacker Reclaimer

| No | Work Order          | Problem  | Root Cause                                     |
|----|---------------------|--|--|
| 1  | WK151111.0007       | ST/RE Need check and rectify CRD cable reel due to Trip Out                              | Motor winding burn out                         |
| 2  | WK190518.0002       | STARE: Please check and rectify Cable CRD fault  | Cable slack                                    |
| 3  | WK200307.0001       | SR : Please check and rectify due to CRD often fault active                              | Cable slack                                    |
| 4  | WK201003.0007       | SR : Need check and repair due to hose reel rotation not sync with CRD , and often fault | Limit switch not working properly              |
| 5  | WK220705.25689<br>5 | SR: CRD Cable out of position reeling drum and fault status active                       | Cable twisted can't enter the drum and damaged |

### Note:

On October 15<sup>th</sup>, 2017, Coal handling System had totally stop because CRD cable to stacker reclaimer was short circuit and damaged. The 11kV voltage interfere to the control cable and made some PLC cards damaged by short circuit. Coal delivery to bunker interrupted and resulted plant de-rating.



## *Counter Measure*

### **❑ Retrofit the CRD to IGUS Chain Flex system**

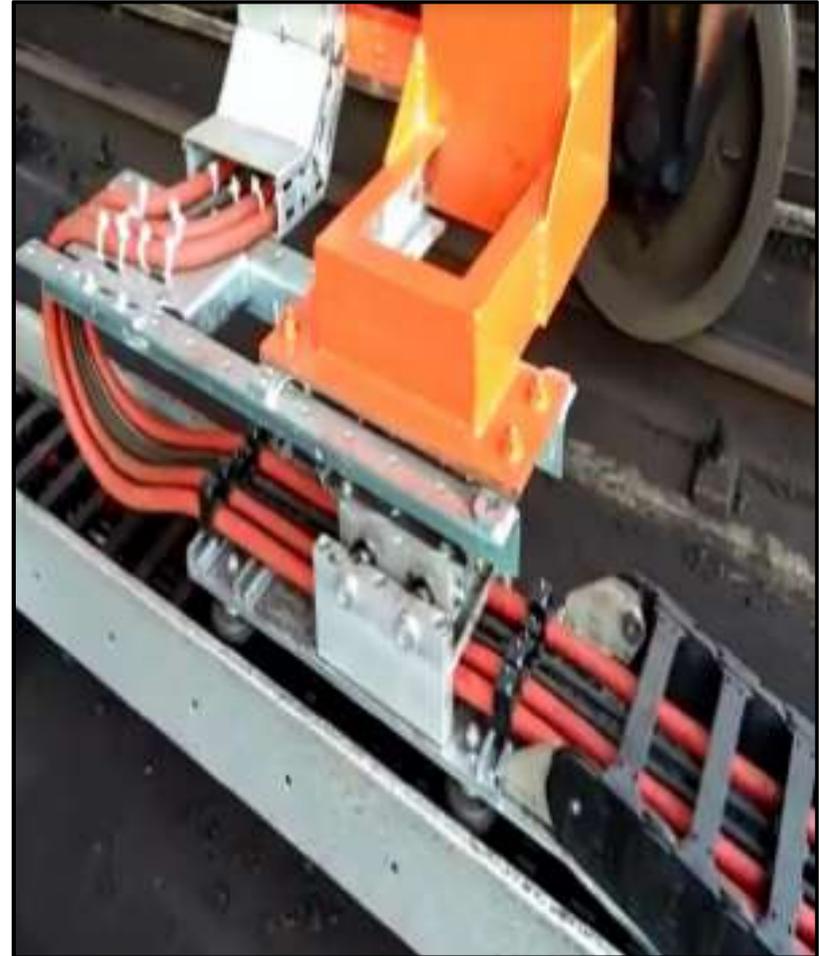
This IGUS chain flex we have been implemented on the tipper car BC-08A & BC-08B, and currently the system running well, less maintenance, and trouble free.

- Tripper Car BC-08A, Retrofit CRD to IGUS Chain Flex (MOH-2020)
- Tripper Car BC-08B, Retrofit CRD to IGUS Chain Flex (MOH-2022)

### **❑ Propose Retrofit on GTSU & Stacker Reclaimer:**

- GTSU-01 (MOH-2024)
- GTSU-02 (MOH-2026)
- Stacker Reclaimer (MOH-2028)

## Counter Measure



Picture of IGUS Chain Flex System of Tripper Car



## Comparison IGUS Chain vs CRD

| Parameter                                   | IGUS® ECS                    | CRD                          | Remark                   |
|---|------------------------------|------------------------------|--------------------------|
| <input type="checkbox"/> Motor              | <input type="checkbox"/> No  | <input type="checkbox"/> YES | Need Electrical Power    |
| <input type="checkbox"/> Reducer Box        | <input type="checkbox"/> NO  | <input type="checkbox"/> Yes | Need Lubrication         |
| <input type="checkbox"/> Slip Ring Box      | <input type="checkbox"/> NO  | <input type="checkbox"/> YES | Need Maintenance check   |
| <input type="checkbox"/> Control Switch     | <input type="checkbox"/> NO  | <input type="checkbox"/> YES | Need Maintenance & spare |
| <input type="checkbox"/> Drum               | <input type="checkbox"/> NO  | <input type="checkbox"/> YES | Need space               |
| <input type="checkbox"/> IGUS Chain Flex    | <input type="checkbox"/> YES | <input type="checkbox"/> NO  | No need electrical power |
| <input type="checkbox"/> IGUS guide through | <input type="checkbox"/> YES | <input type="checkbox"/> NO  | Less Maintenance         |



## *Advantage*

### **The advantages using IGUS chain flex system are;**

- Chain flex system provide a continues and flexible link for the cables, allowing for smooth and controlled movement.
- They are generally more durable and requires less maintenance than cable reels
- Better suited for application with frequent and rapid movement.
- Longer lifespan, less consumable part, and easy maintenance



## Budget

**Total budget required for GTSU-01 is USD 121,892.00**

| No           | Description                                    | Budget (USD)       |
|--------------|--|--------------------|
| 1            | Materials (IGUS e-Chain)                       | 35,326             |
| 2            | IGUS Chain Flex Cable (power, control, and FO) | 29,453             |
| 3            | IGUS Stainless steel guide through             | 30,833             |
| 3            | Installation Cost                              | 26,280             |
| <b>TOTAL</b> |  | <b>USD 121,892</b> |

**GTSU-02 (2026)**

- Estimated Budget is USD 140,000

**STACKER RECLAIMER (2028)**

- Estimated Budget is USD 200,000



# Schedule

The replacement to IGUS for GTSU-1 will be started as following schedule:

| Process              | 2024    |          |       |       |     |      |  |
|----------------------|---------|----------|-------|-------|-----|------|--|
|                      | January | February | March | April | May | June |  |
| IR & PR Approval     | ➔       |          |       |       |     |      |  |
| Issuing PO           |         | ➔        |       |       |     |      |  |
| Materials Delivery   |         | ➔        |       |       |     |      |  |
| Project Installation |         |          |       |       | ➔   |      |  |



Thank You