



Tata Steel Processing & Distribution Limited Presents

Innovative Approaches Towards Emerging OHS Challenges

CII-Symposium and Exposition

11th -12th September, 2014

A brief about TSPDL

LOCATIONS

1. Kolkata – Head Office
2. Kolkata – Sales Office
3. Jamshedpur – CR Plant
4. Jamshedpur – Bara Plant
5. Jamshedpur-Tubes Plant
6. Kanpur
7. Rudrapur
8. Ludhiana
9. Faridabad – CR
10. Raipur
11. Bhubaneswar
12. Pune
13. Bangalore
14. Chennai



- *We are the largest Steel Service Centers in India*
 - *We are now prestigious JRD Tata QV 600+ company (for our business excellence)*
- *All our Units are OHSAS 18001:2007 certified*



Services:-Slitting,CTL,Auto component mfg,Plate processing, corrugated sheets.

Our OHS Challenge

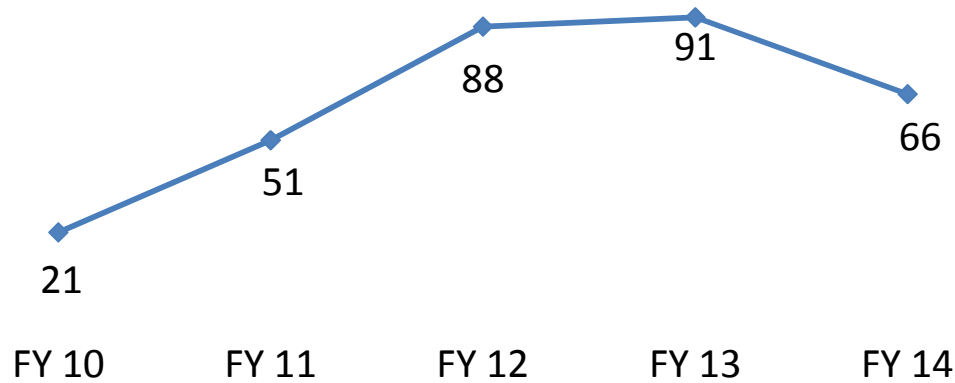
Safety in Material handling:-The process consists of slitting; Cut to Length, packaging etc. wherein there is a considerable amount of material handling activity involved in operation.

The steel coils and sheet packets either in the form of raw material or finished goods (FG) requires handling through overhead cranes (EOT) inside shop floor.

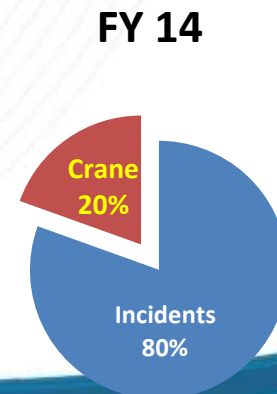
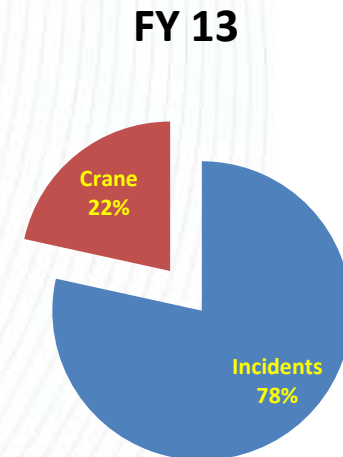
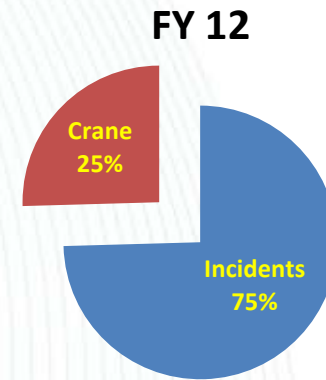
Over the years we have experienced number of serious near miss incidents and dangerous occurrence in EOT Crane operation where crane operator unable to control the crane movements due to sudden malfunction of operating remote control.

Few Statistics of crane related incidents

No of near Misses captured

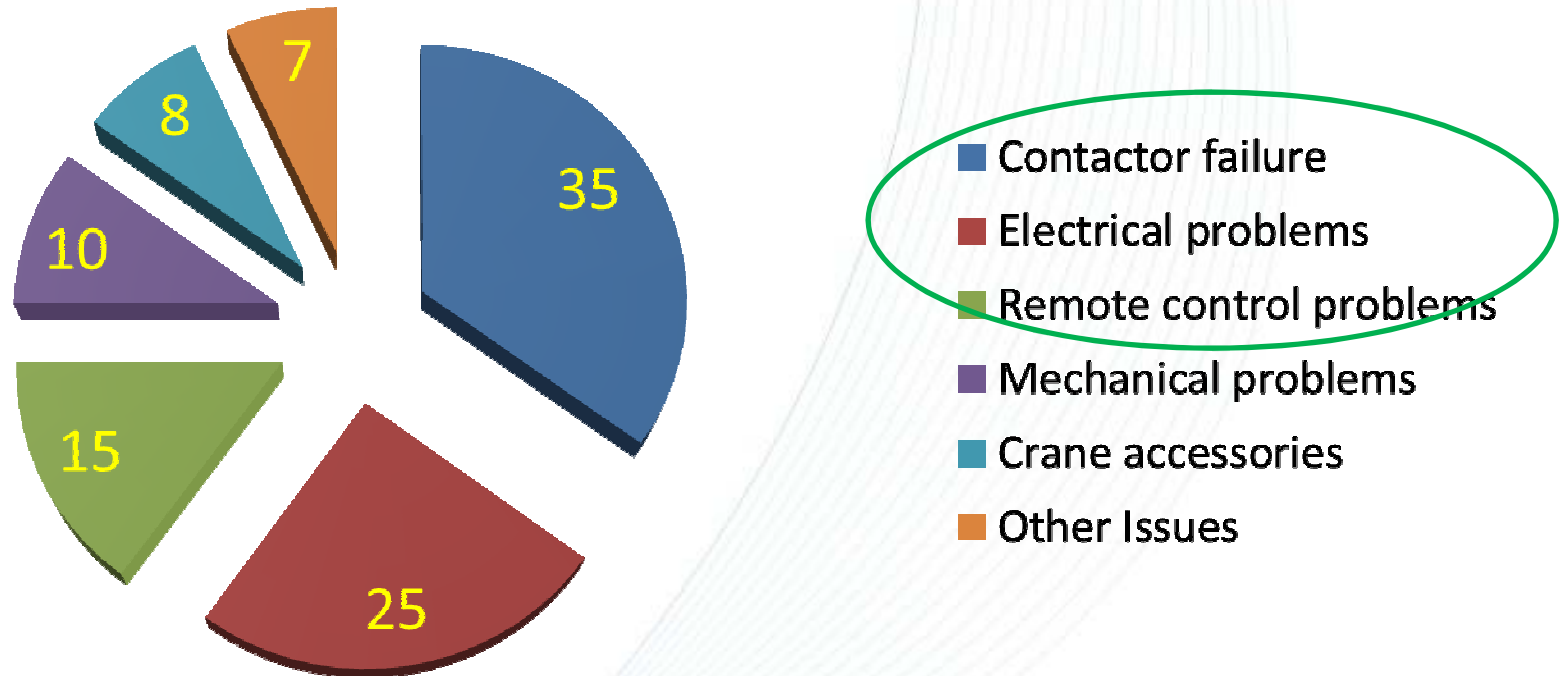


We can see share of our incidents relate to our EOT cranes



Component wise crane incident failures across years- a consolidated study

% Elements involved



What is our challenge???

1. Severity of crane incidents are high and are having fatality potential
2. Senior management encourages to improve safety

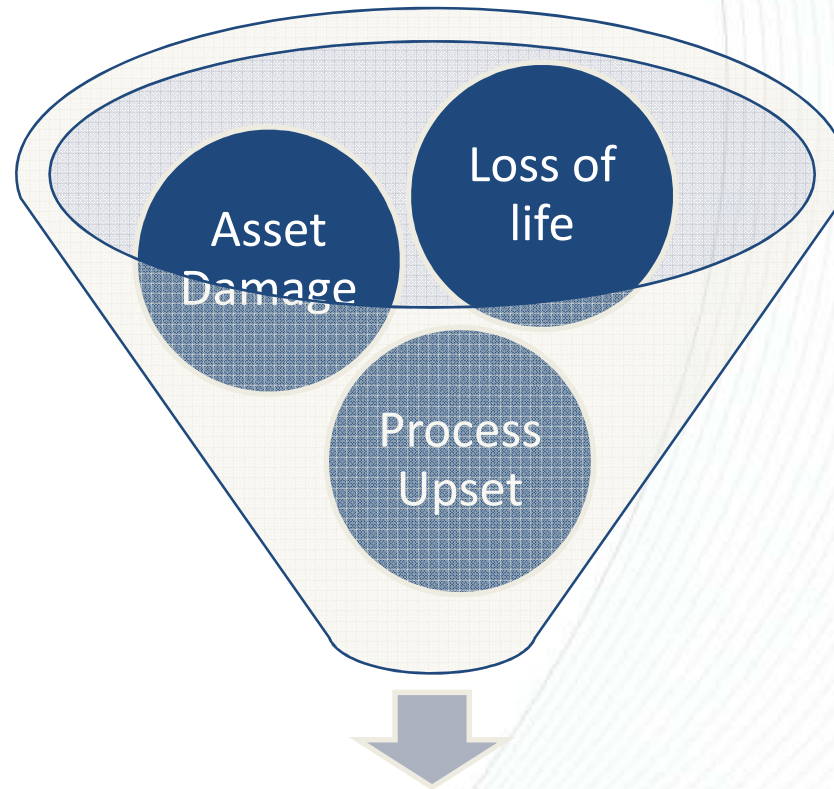
3. Need of the hour-*SAFETY INNOVATION*

1. Most of our plants are old and having cranes with older technology
2. Cranes are used based on contactor logic
3. Upgradation of all cranes is a very costly affair

Sample Snapshot of a crane incident

- On 18.11.2013 it was observed in HR Plant Pune that one crane has become in continuous LT motion.
- The remote control to the crane has become non operational –which means the crane is not in operators control.
- The operator runs a distance of 30 Mtrs to the crane Breaker at the end of the gantry bay
- A NEAR MISS IS REPORTED-due to the presence of mind of the crane operator the incident is averted.

What could have happened



OHS CHALLENGE

Investigation

- **Why?** *Inadequate Engineering control to stop crane at spot*
- **Why?** *Remote imparted not responding, failing sporadically where consequences are higher*
- **Why?** *Systems requires additional protection*
- **Why?** *Limited scope of technology*

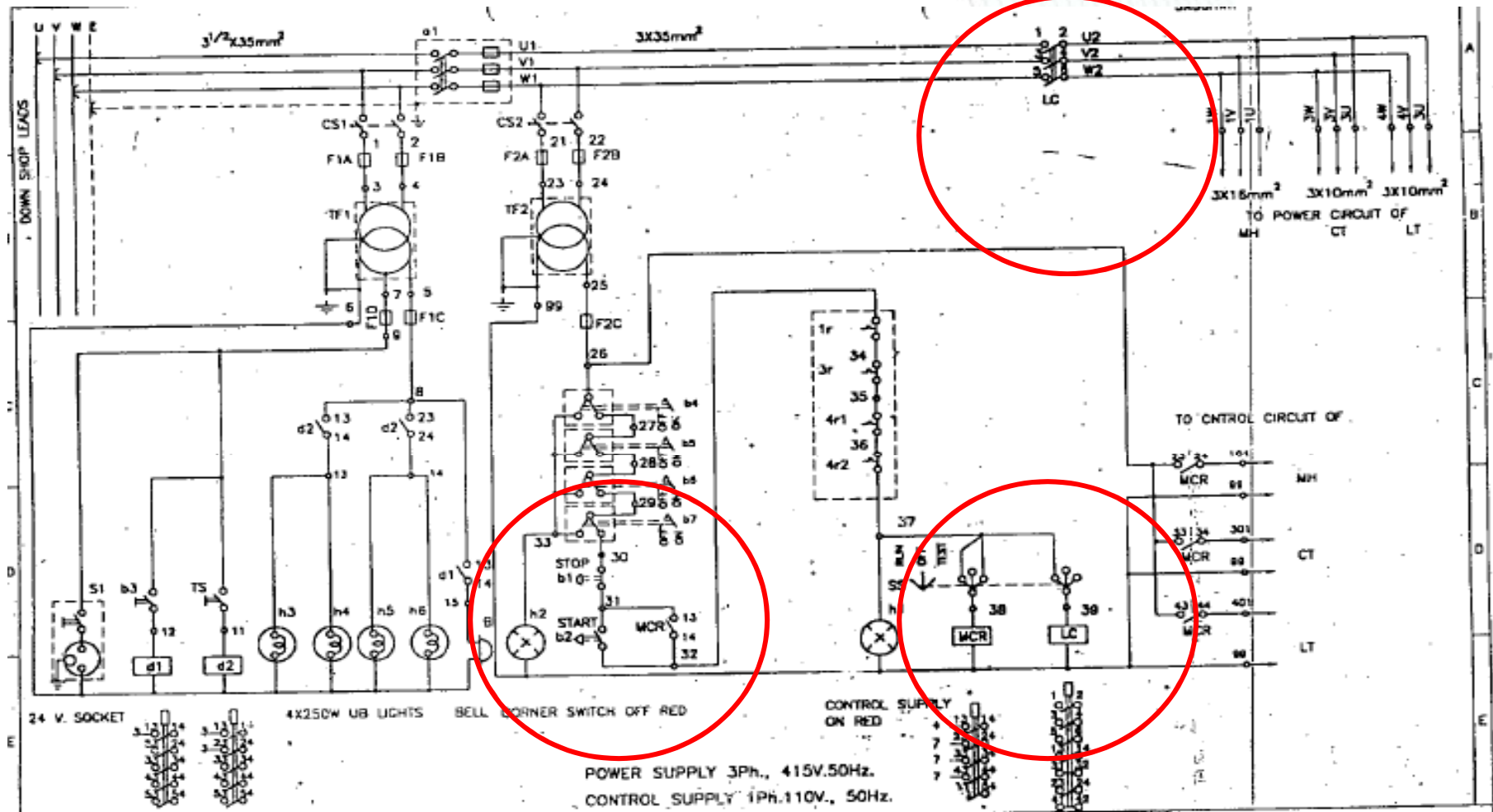
ACTION PLAN:-*Elimination of the challenge through Engineering Control*

Few photographs where if crane fails can lead to loss/damage of property and accidents

Over the years we had some serious near misses in EOT Cranes, where crane operator was unable to control the crane movements due to sudden malfunction of operating remote controller. During this type of sudden Remote controller malfunction crane operator was unable to stop, Crane Power using Emergency Stop Button of remote and he had to rush to DSL main Switch, to switch off the main power. It was found out that, although this incidence can be rare, but can cause major accident which can even lead to FATALITY, if the uncontrolled crane moving at a considerable speed hits a human being/machine/truck/truck driver.



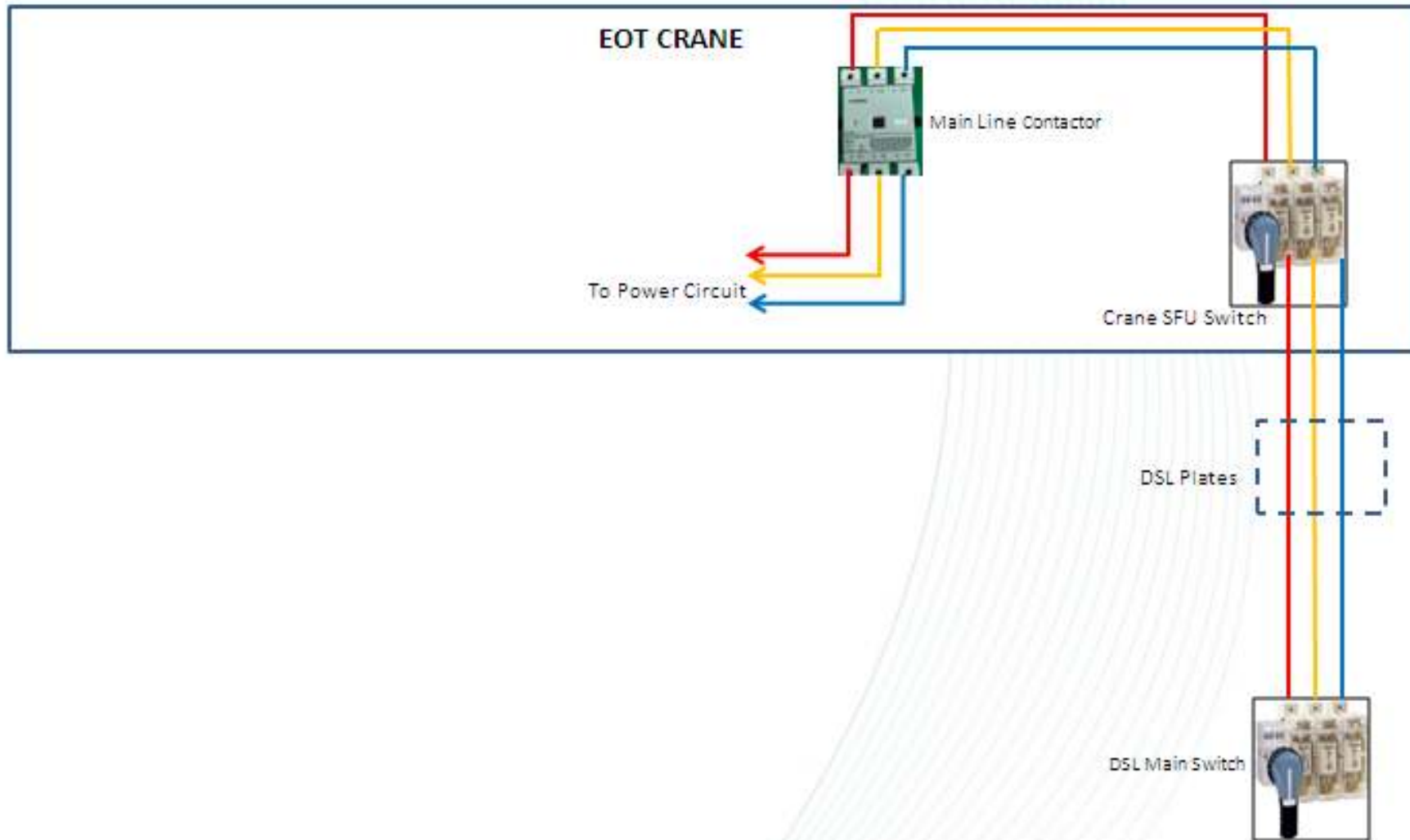
Present situation



AMENDMENTS		R 1	R 2	R 3	R 4	R 5
JOB NO. 97-98/C/TTD/68CD					NAME	DATE
TITLE MAIN POWER & CONTROL CIRCUIT					DRAWN	21/8/98
DETAILS 15 TON. EOT CRANE CL-III, INDOOR. SPAN 28.3M.					CHECKED	25/8/98
CLIENT M/S TATA TECHNOGYNE LTD.					APPROVED	
					DWG. No. 97-98/C/TTD/68CD/70.00	
					FILE NAME 98CJ7001	



Simple Diagram



Elimination Process Project Timeline

Sl No	Actions		JAN	FEB	MAR	APR	MAY	JUN
1	Matter put up in UIC meeting	PLAN	7th					
		ACTUAL						
2	Identify alternative solutions	PLAN	15th					
		ACTUAL						
3	Feasibility Study with relevant Supplier	PLAN	23rd					
		ACTUAL						
4	Trial Run in CRS Bay	PLAN		15th				
		ACTUAL						
5	Visual SSOP and crane checklists	PLAN			25th			
		ACTUAL						
6	Successful reports and team validation	PLAN			25th			
		ACTUAL						
7	Horizontal Plan in other cranes in Pune	PLAN				15th		
		ACTUAL						

Proposed Solution-A

Inputs from Tata Steel Europe:

Issues of crane remote failure cases were discussed with Tata Steel India & Tata Steel Europe.

Comments from Tata Steel Europe received are mentioned below:

1. Normal modern radio control systems in UK have the following safety features built in to prevent potential failures,
2. They permanently transmit - even with no button pressing - so that if there is a signal problem the crane will not function.
3. Safety / e stop circuits have 2 circuits - known as **double redundancy**, the e stop circuit secondary circuit will function in the event of a failure of the first circuit.

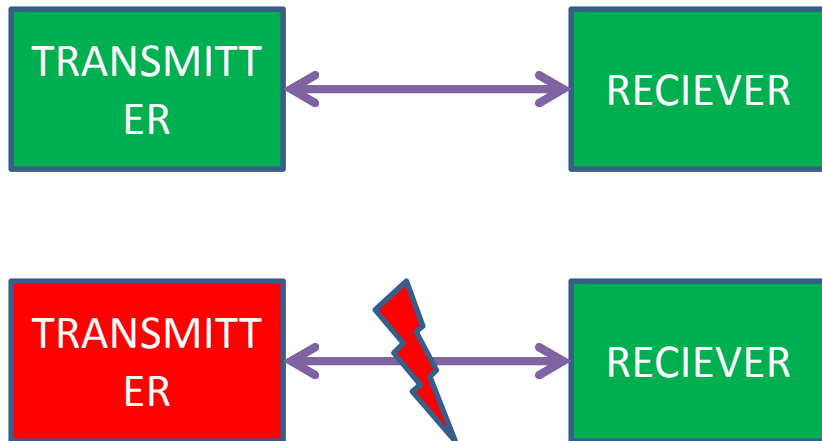
Pictorial Representation



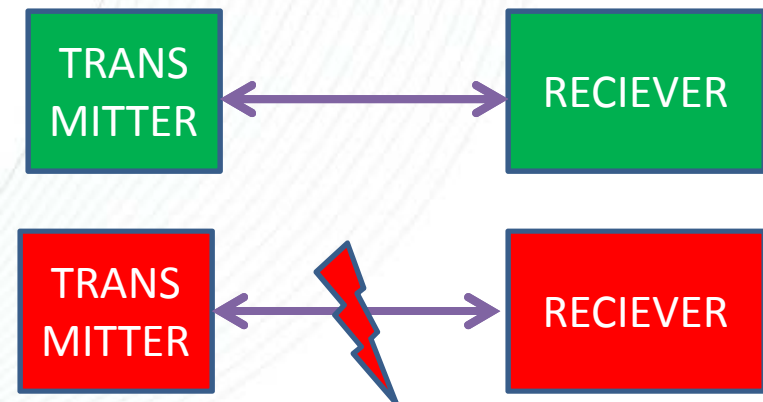
They permanently transmit - even with no button pressing - so that if there is a signal problem the crane will not function

Comparison between our case and theirs

- In our case if the crane remote goes out of control the crane circuit behaves independently



- In TATA steel Europe case if the crane remote handshaking goes missing then the crane operation halts itself



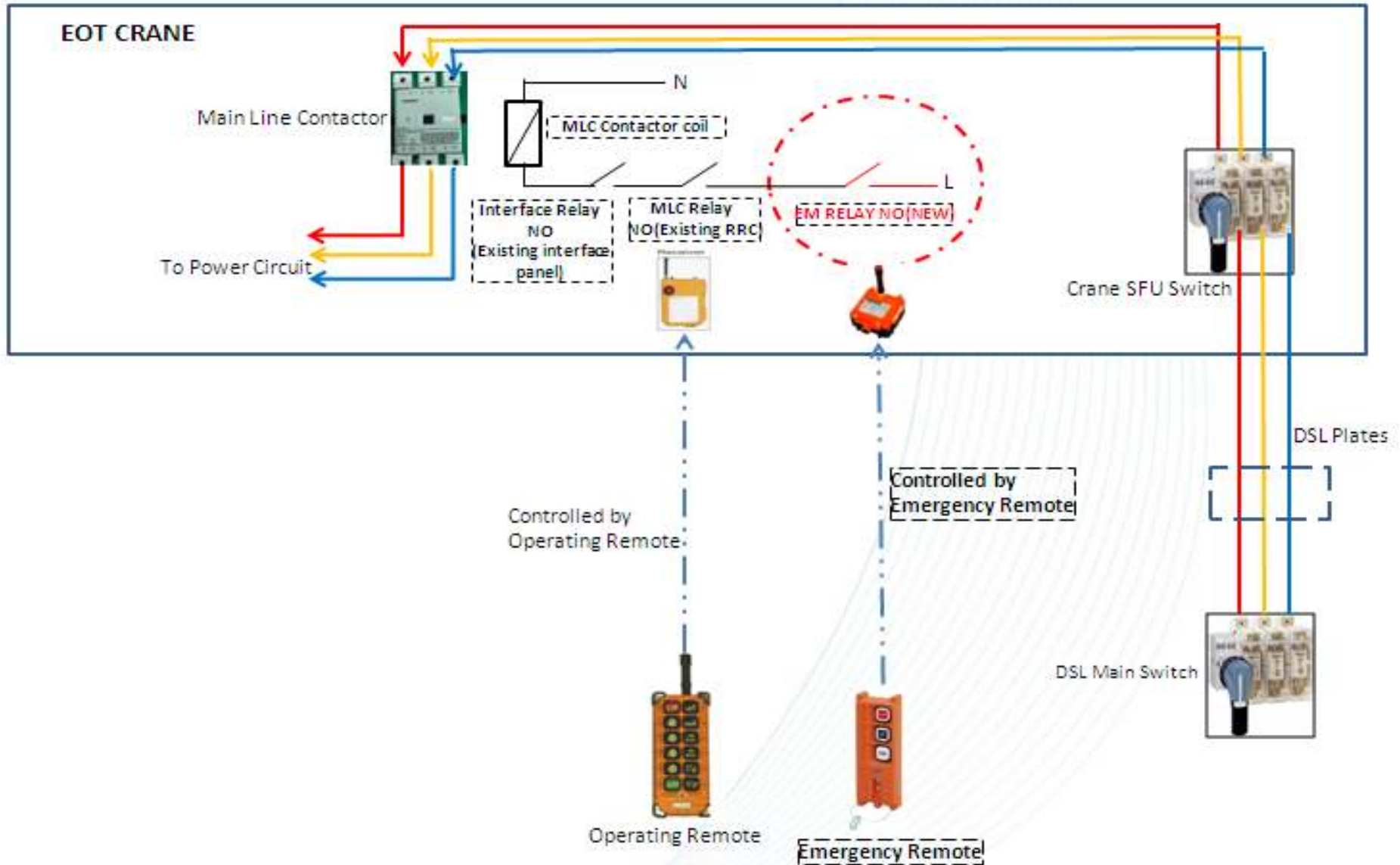
Proposed Solution-B—our action plan

Inputs from M/S Acropolis:

After Discussion with M/s Acropolis we have designed to install an **Emergency Control Relay (EM-Relay)** in series with Main Line Contactor (MLC) control circuit which will be controlled by **an additional small radio remote controller** – henceforth to be called as **Emergency remote**. To operate a particular crane, one crane operator has to carry both operating remote and emergency remote.

In case of malfunction of operating remote, Crane main power can be cut off using emergency remote.

Proposed circuit by M/S Acropolis



EMERGENCY CRANE REMOTE

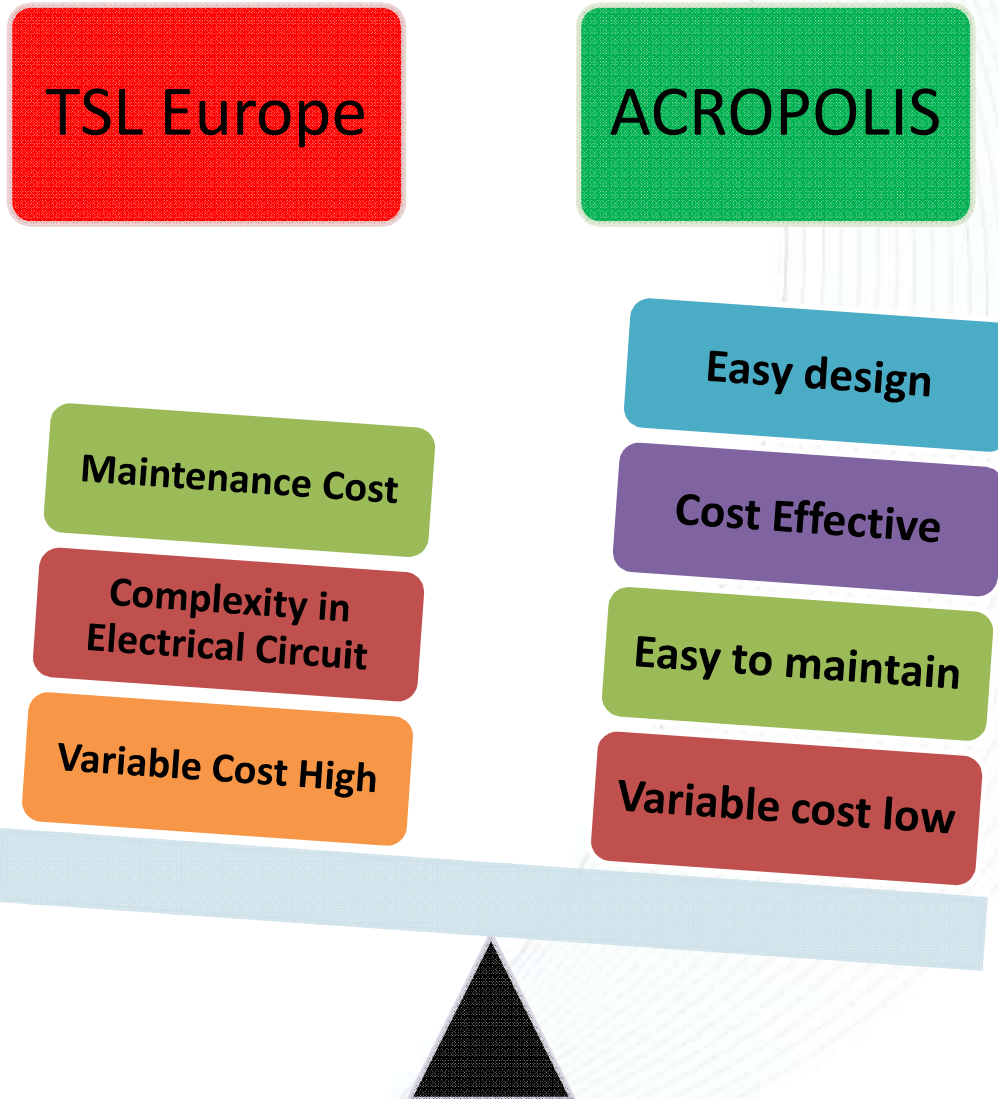
TELECRANE® make Radio Remote Control System **Model F21-2S** with hand held push button type Transmitter suitable for secondary control. The system shall have following designated controls:

Secondary Main Power-On



Emergency Stop-Yes



WHY WE PREFERRED PLAN B



Validation

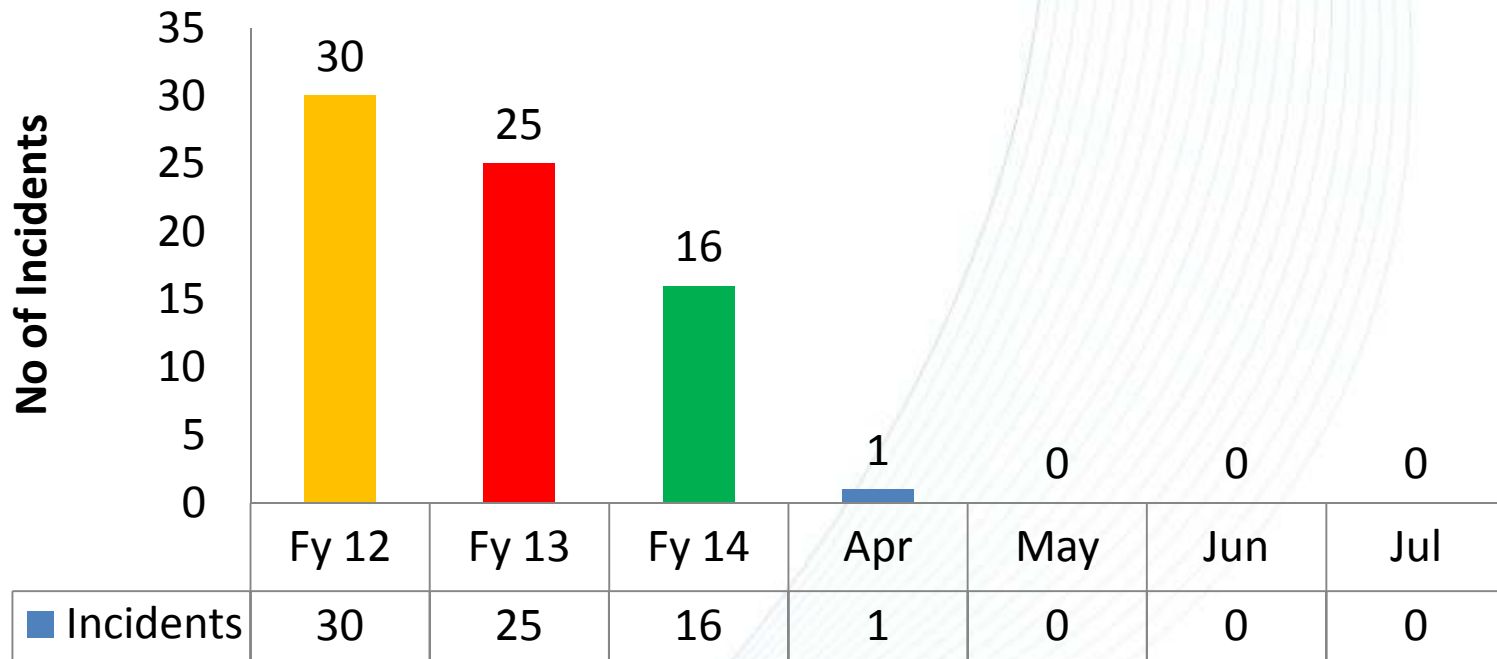
<p>CRANE REMOTE</p> 	<p>EMERGENCY REMOTE</p> 	<p>CRANE BEHAVIOUR</p>
<p>Crane Remote transmission OK</p>	<p>Emergency Remote is pressed</p>	<p>Crane stops as it is in the position where it is stopped</p>
<p>Crane Remote transmission fails</p>	<p>Emergency Remote is pressed</p>	<p>Crane stops as it is in the position where it is stopped</p>
<p>Crane Remote transmission fails</p>	<p>Emergency Remote is pressed ---but fails</p>	<p><i>SPORADIC FAILURE CAN HAPPEN—we are eliminating such low consequence</i></p>

Way Forward

Horizontal deployment across the organization

After implementation of this tele remote facility, we did not face any single crane related incident/near misses in last six months. The risk priority number (*RPN*) has reduced significantly in the material handling areas in the TSPDL Pune plant.

Crane Incidents



Conclusion & Acknowledgement

We have tried to present the OHS challenge innovatively in cost effective and user friendly way and tried to address a specific hazards associated with cranes and minimize it subsequently.

The area of study carried out with EOT crane remote safety in M/s Tata Steel Processing and Distribution Limited (TSPDL). The complete data along with the analysis has been done by safety professional in consultation with operation and maintenance team in the unit. **This particular project has been executed in Pune Plant as a pilot project in TSPDL.**

Thank You

we care for tomorrow



TATA STEEL PROCESSING AND DISTRIBUTION LIMITED