

Assessment 1 - Ethan Howells

by Ethan Howells

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Ethan Howells

TATA Steel - Trostre

Bridle 2 and 3 Reset

PSDE 4033 HNC Electrical and Electronic Engineering Project

HNC Year 2

TATA Steel - Trostre

Trostre is a tinplate manufacturing plant, owned by TATA Steel. There are three different steels produced in Trostre:

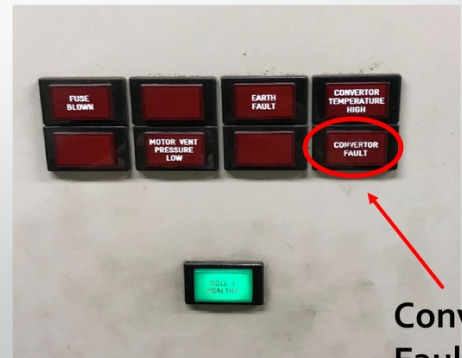
- Electrolytic Chrome Coated
- Laminated Steel
- Tinplated Steel

The factory supplies steels for a variety of customers, such as Heinz and Crown.



Problem Needed to be Solved

The Problem faced is located on the Pickle Line, involving Bridles 2 and 3 which are regularly tripping, on convertor fault. Therefore, causing unnecessary downtime while a specialist is called to reset the drives. The Convertor Fault trip has been investigated, with no root caused found. This costs the company on average £650 every half hour the line is down.



Convertor
Fault

Project Specification

Discussed with Engineer the nature of the problem, who then granted a time scale and budget for the Project.

- Time Scale - 9 Months
- Budget - £1,000
- Minimal Disruptions caused to Line
- Prioritise Safety

Possible Solution 1

One possible solution could be to expand the existing reset circuit, for the Exit Scrap Chopper. The Operators in the exit pulpit of the Pickle Line, have the ability to reset the Exit Scrap Chopper, via Pushbutton. This is a hardwired circuit, that simulates the reset function on the DC drive. A solution for the problem, would be to expand this circuit, in order to include both Bridle 2 and 3.

Pro's	Con's
The Project will be finished a lot quicker.	No Safety Features e.g.; Counter, Timer.
Less Cable Run.	No Alarms will be displayed.
No PLC required.	New Button will be needed as original is labelled 'Scrap Chopper'

Possible Solution 2

An Alternative solution would be to use the Siemens S7 PLC. A Reset button could be created on the Operators HMI screen, using iFix. The Reset button would then communicate to the S7 PLC, via Ethernet Link. Code can then be written to include timers and lock-out functions to prevent over use of the reset button in the event of a more severe fault on the drive. The PLC would then output a signal to the drives simulating the reset function.



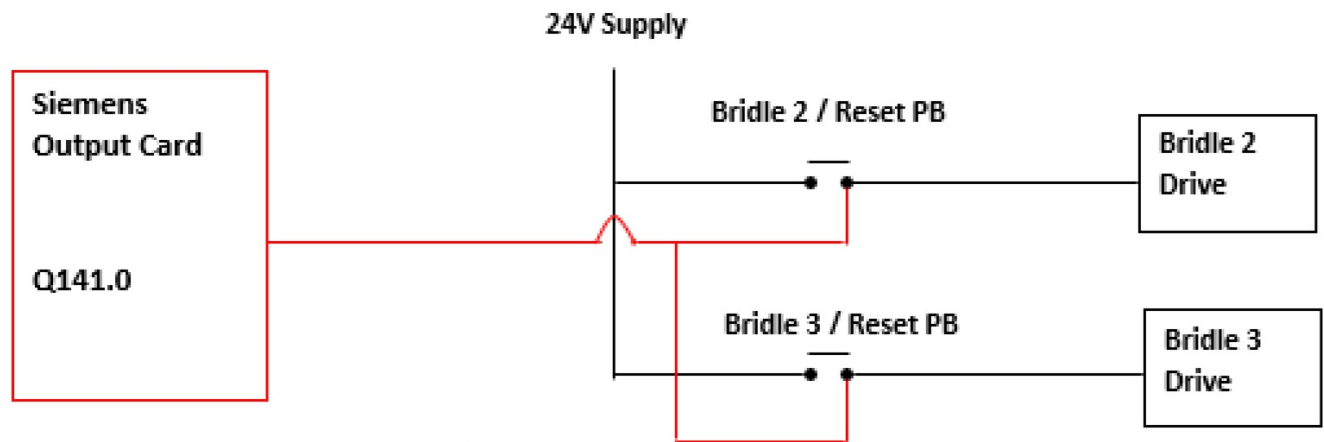
Pro's	Con's
More Safety Feature's e.g. Counter, Timer	Time Consuming, as requires more software
Saves company money, as prevents line being down	More Cable, therefore costs more
Allows room for additional features	Engineering may require training

Chosen Solution

My Chosen solution is to use the Siemens S7 PLC on the Pickle line.
Reasons for this choice:

- More Safety Features
- Provides Feedback i.e Number of Trips
- Allows room for future expansion.
- Aids with future fault finding, due to monitor mode on the program

Chosen Solution



Note – Red Cables are
New Additions

Project Plan

Mc	Task Name	Duration	Start	Finish	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
★	Find Suitable Project	14 days	Tue 11/09/18	Fri 28/09/18								
★	Speak to Line Engineer	7 days	Fri 28/09/18	Mon 08/10/18								
★	Research Project	14 days	Mon 08/10/18	Thu 25/10/18								
★	Find Alternative Solutions	14 days	Thu 25/10/18	Tue 13/11/18								
★	Decide Final Solution	7 days	Tue 13/11/18	Wed 21/11/18								
★	Risk Assessment	7 days	Wed 21/11/18	Thu 29/11/18								
★	Research and Buy Parts/Components	14 days	Thu 29/11/18	Tue 18/12/18								
★	Prototyping Programme	30 days	Sat 05/01/19	Thu 14/02/19								
★	Installing Cable	7 days	Thu 14/02/19	Fri 22/02/19								
★	Installing Programme	14 days	Fri 22/02/19	Wed 13/03/19								
★	Testing	2 days	Wed 13/02/19	Thu 14/02/19								

Design

The design of the PLC programme will be on the Siemens S7 system, which will be programmed and tested before implementing. The programme will be tested prior to installation, to avoid affecting the line and causing unnecessary down time. The system will be tested by forcing the Operators Reset button, to see if the Output energises as expected.

The HMI will also be designed used iFix, this can be designed, tagged and tested prior to downloading.

Build, Test and Contingency

The implementation of this design will be completed when there is a maintenance planned, as I will need the Exit PLC isolated, in order to run cables and connect to the output card, both bridles will also need to be isolated, to connect to the reset push buttons and this is only possible during a maintenance period.

The final test, will be completed on start-up after the maintenance period, the programme can be monitored to check the outputs are energising when the reset button is pressed by the operators.



Any Questions?

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GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

60/100

Instructor

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GRADING FORM: CSG-RUBIC

ETHAN HOWELLS

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RESEARCH-INFORMED LITERATURE



Background investigation into project was demonstrated. 6/10 Depth of research with relevant literature for alternative solutions was limited. 5/10

11/20

KNOWLEDGE AND UNDERSTANDING



Problem definition was clear and an understanding was demonstrated. 3/5 Project constraints have been highlighted and codes of practice and standards are company policies. Response to questioning on this was good. 3/5 Environmental and sustainability limitations were covered in questioning and awareness of this was evident. 2.5/5 Functional design was clear and offered for both solutions. Lacked some technical content. 3/5 Response to questioning was very good and confident. 6.5/10

18/30

ANALYSIS



Problem definition from an analysis perspective was good and a good understanding of the testing needed. 3.5/5 Functional design is good and a good understanding is demonstrated. 6/10 Justification of final solution was carried out with comparison of solutions, but the alternative solution offered was

12/20

technically weak. 2.5/5

PRACTICAL APPLICATION AND DEP.

 Design specification from a practical perspective was clear and good logical answers were given in questioning. 3/5 Critical choice and justification for final solution was clear, but the alternative solution did not present a real technical alternative. 5.5/10 project plan was coherent and followed a logical timeline. 3.5/5

12/20

SKILLS FOR PROFESSIONAL PRAC.

 Quality of slides was good. 3.5/5 Delivery of presentation was a good standard. 3.5/5

7/10