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1910603

by Benjamin Brickle

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32-LC-316

Level Controller Upgrade

Ben Brickle

Overview



The Problem?

- Poor Control
- No remote indication
- Mechanical low level switch, prone to failure
- Overflow system drains to sewage, poor efficiency
- Pneumatic control, offers no indication of instrument failure





What will this project improve?

- Reliable instrumentation used to control and raise alarms
- Removes potential for human error
- Using instrumentation that is easier to maintain
- Electronic control means that the control loop cannot be changed/alterd easily, and any changes can be tracked/recorded

Possible Solutions? PLC



- Good level of control
- Variety of IO
- Proven method of control within industry, standard programming languages
- Not company's preferred method of control,
- Would require electrical enclosure to house PLC, requires greater hardware.
- More expensive
- Separate modules
- Would need high-spec PLC to meet rigorous standards and specifications, means small unitary PLC unlikely to be suitable.

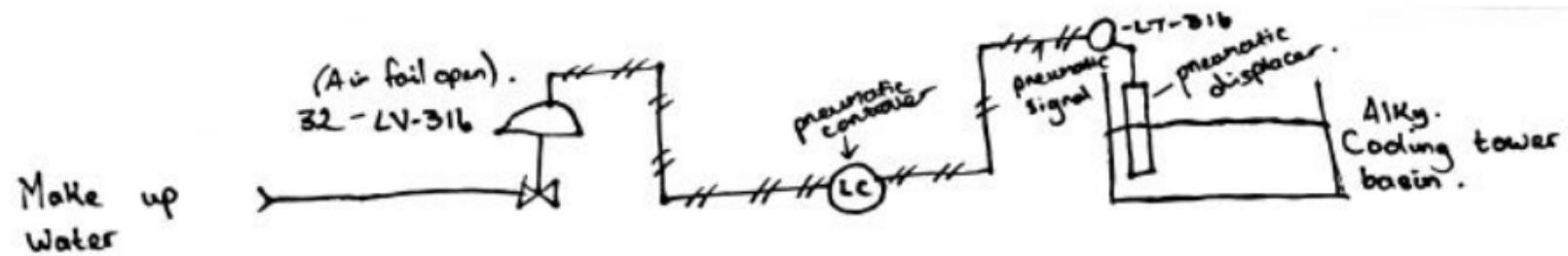
Chosen Solution? Create new control loop for DCS

- Would meet all required standards
- Infrastructure in place, easier and cheaper
- Easy to include on operator screen
- Familiarity for maintenance and operations

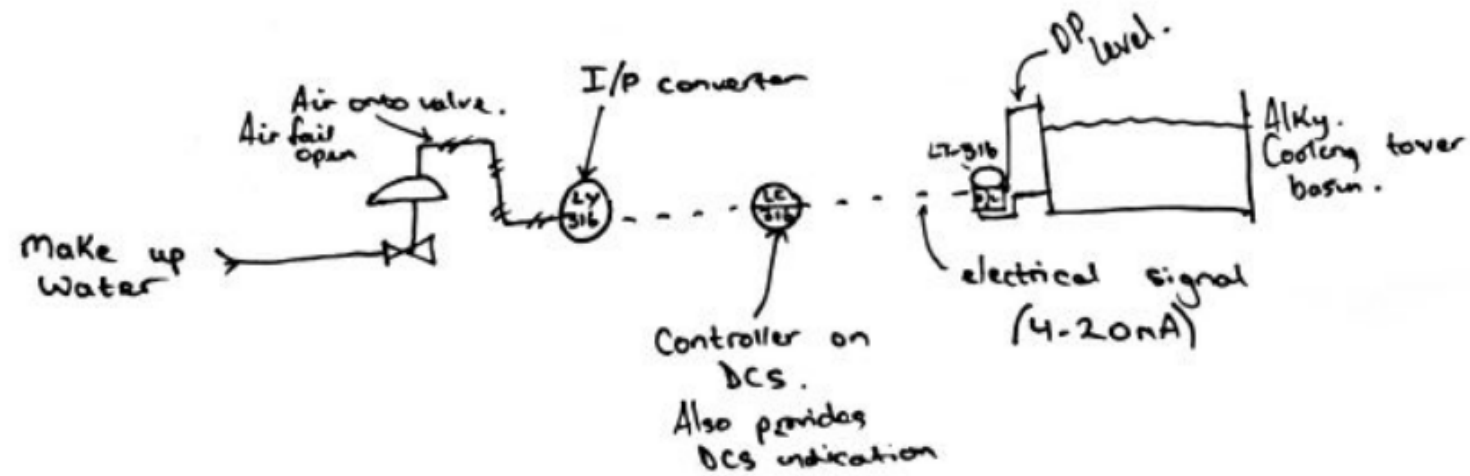


- Would need to be re-configured with an upgrade of DCS

CURRENT

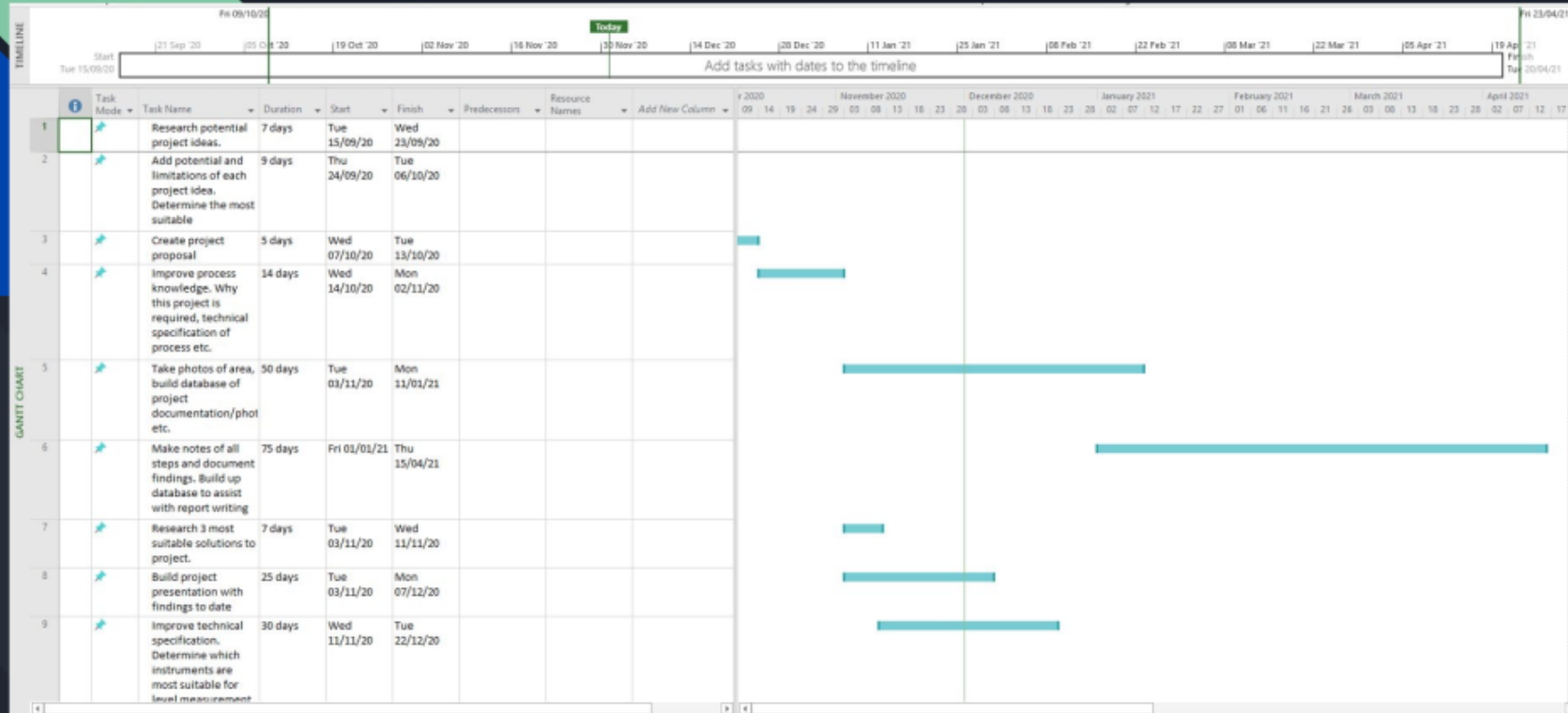


PROPOSED





Task	Expected Outcome	Actual Outcome	Pass/Fail
Determine most suitable instrumentation			
Determine cal. Figures for instrumentation (output 4-20mA)			
Build points on DCS	Have active points on DCS screen (simulation)		
Build PID Loop on DCS, with calibration figures in place			
Use mA source to simulate instrument loop and figures, record DCS reaction to change in mA signal	Watch scaled values on DCS increase with increased mA signal		
Use mA source to simulate alarm points and see whether alarms are raised	See DCS alarms raised at set mA signal		
Monitor control continuously with a change in input			



FINAL GRADE

GENERAL COMMENTS

70/100

Instructor

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BENJAMIN BRICKLE

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RESEARCH-INFORMED LITERATURE

 Reasonable project background and explained the context very well. 6.5/10 Evidence of research including PLC control. 5.5/10

12/20

KNOWLEDGE AND UNDERSTANDING

 Project purpose was explained clearly and examples from industry included in the explanations. 3.5/5 Project constraints and risks were discussed and action plan in place. Codes of practice and standards were explained for the project including intellectual property law. 3.5/5 Environmental and sustainability issues were explained in the questioning section and the benefits of the project with these issues. These are part of the industry policies. 4/5 Functional design was explained but a block diagram would have been more informative than a hand drawn diagram. 3/5 Response to questioning was very good and key points about the project were identified. 7/10

21/30

ANALYSIS

 Problem was clearly defined and linked with industrial problem. 4/5 Functional design specification was explained very well. 7.5/10 A good argument given for the choice of final solution. 3.5/5

15/20

PRACTICAL APPLICATION AND DEP.

 Design spec included enough detail and an example which was explained very clearly and aided with a diagram although a block diagram would have been more informative. 3.5/5 Argument for critical choice of final solution was very good with plenty of details given in the explanation. 8/10 Project plan included a work breakdown of criteria for the project. 3.5/5

15/20

SKILLS FOR PROFESSIONAL PRAC.

 Slides contained good relevant information resulting from research. 3.5/5 Overall delivery was very good with attention to detail. 3.5/5

7/10