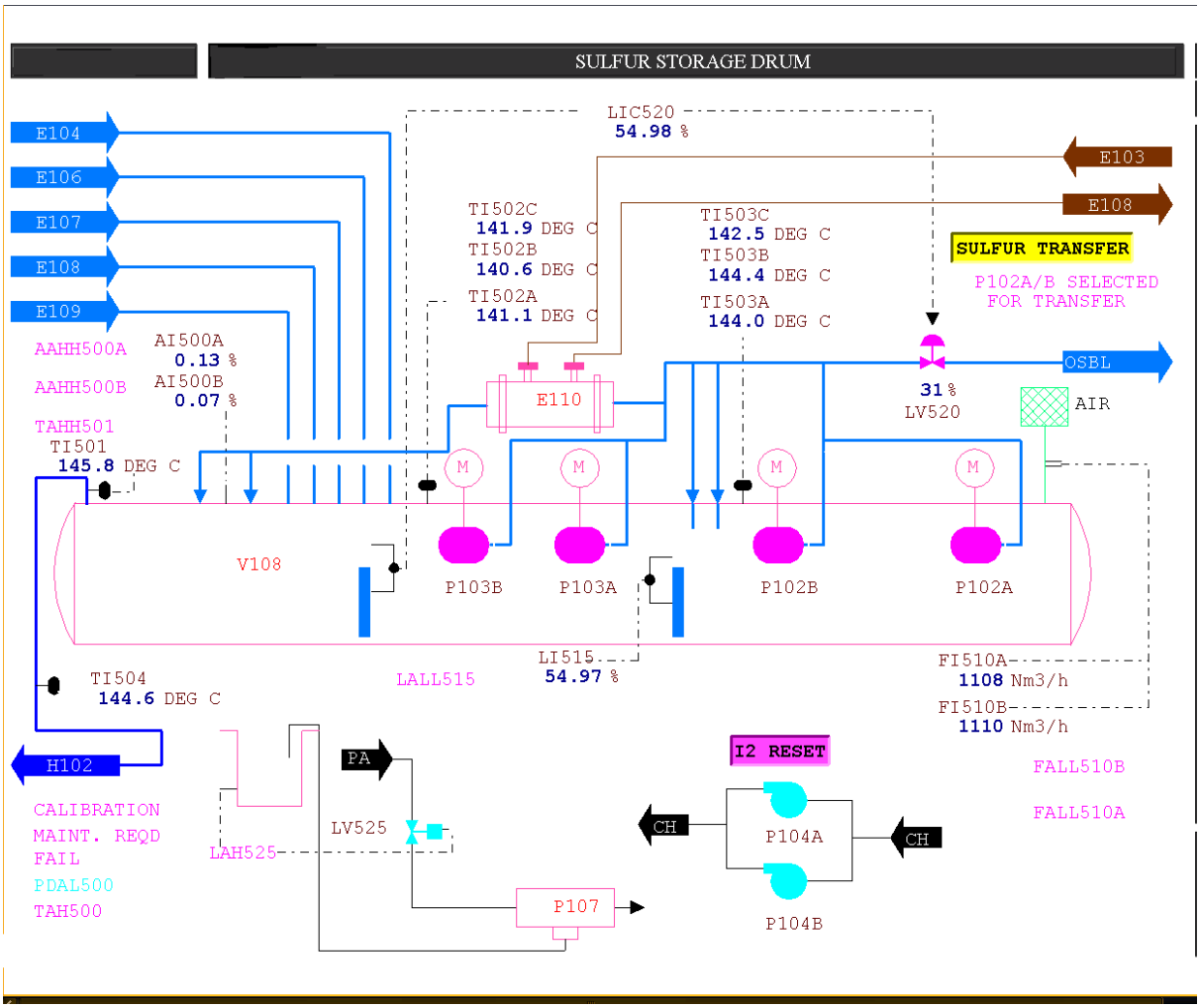
1. Introduction

Tuning level controllers is always been challenging task, With the help of three point ramp identification method provided in AptiTune, user can easily identified the ramp model with one single step change. The identified model is further used in AptiTune to get one shot tuning parameters.

Sulphur Storage & Degassing Tank

Sulphur storage and degassing is a key component of the sulphur recovery facilities. It consists of two systems: liquid sulphur storage and sulphur degassing.

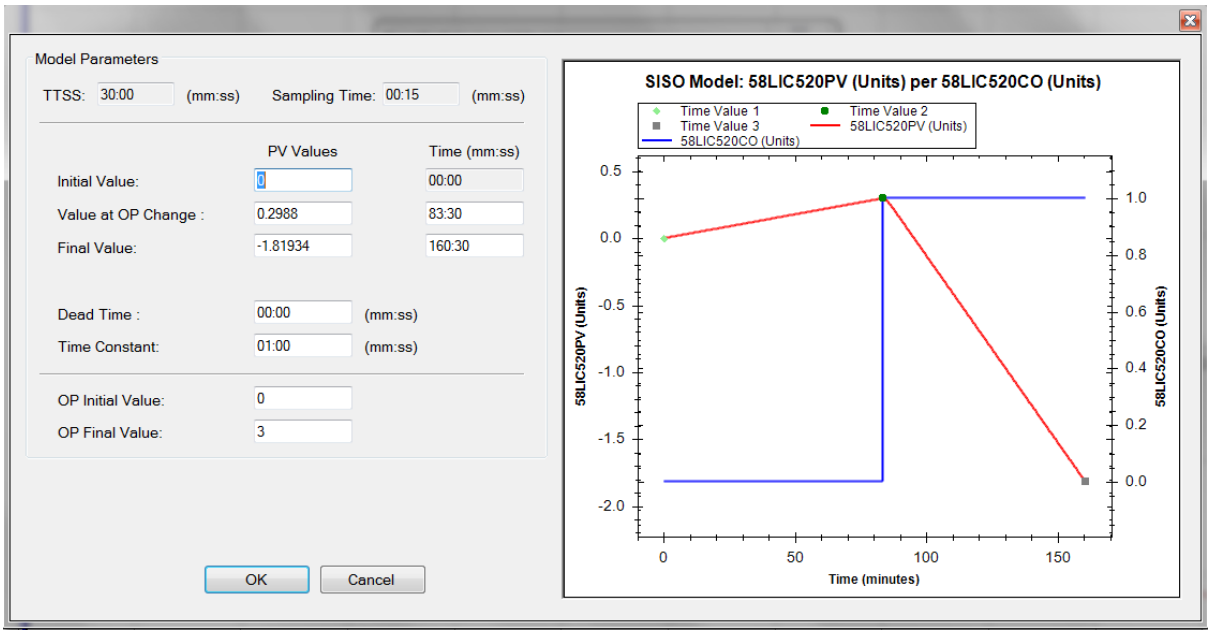


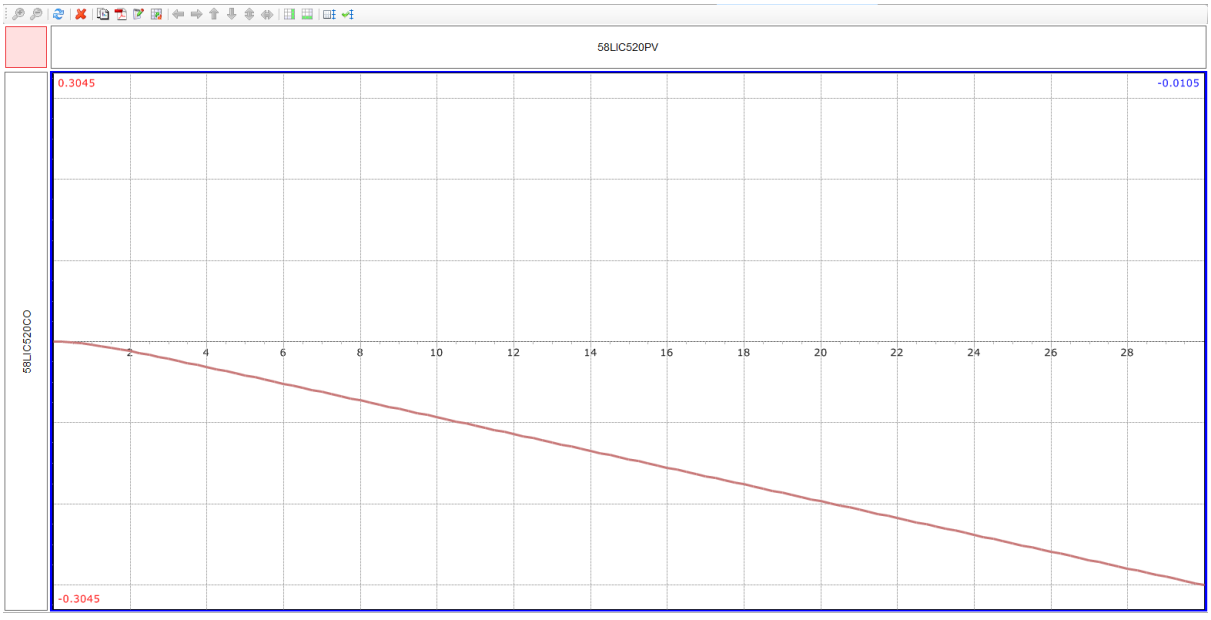
V108, sulphur storage tank handles molten sulphur that solidifies at 115 C, the system is steam heated through exchanger E110 to prevent freezing and plugging with solid sulphur. The molten sulphur is circulated using pumps P103A/B whereas P102A/B are used to transfer the molten sulphur other facilities. The level controller LIC520 is used to maintain certain level in the tank. Air is passed through the tank for degasification of sulphur, gases recovered are sent to incinerator using H102 to burn.

2. Tuning Project Approach

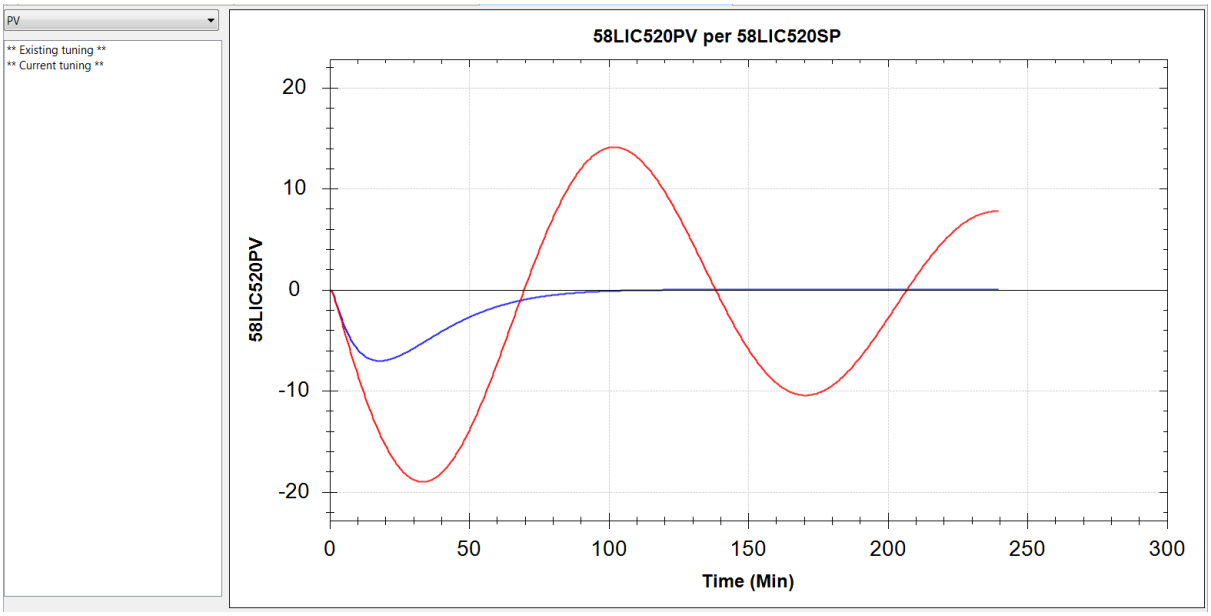
During pre-test activities on the unit, it was found the level has oscillatory behaviour. The loop was tested in manual and three points ramp identification method was used for open loop model.

1. Loop was put in manual & let it stabilised for some time and noted process values PV, OP and time as initial values.
2. Make a change in output and note the values as values at time of OP change.
3. Once the process was stabilised due to OP change, the final valves were noted.





Identified model is used to identify the optimised PID tuning parameters. The loop was tuning with one shot tuning parameters got from AptiTune. Following disturbance rejection plot clearly shows the performance improvement of current tuning against the existing tuning.



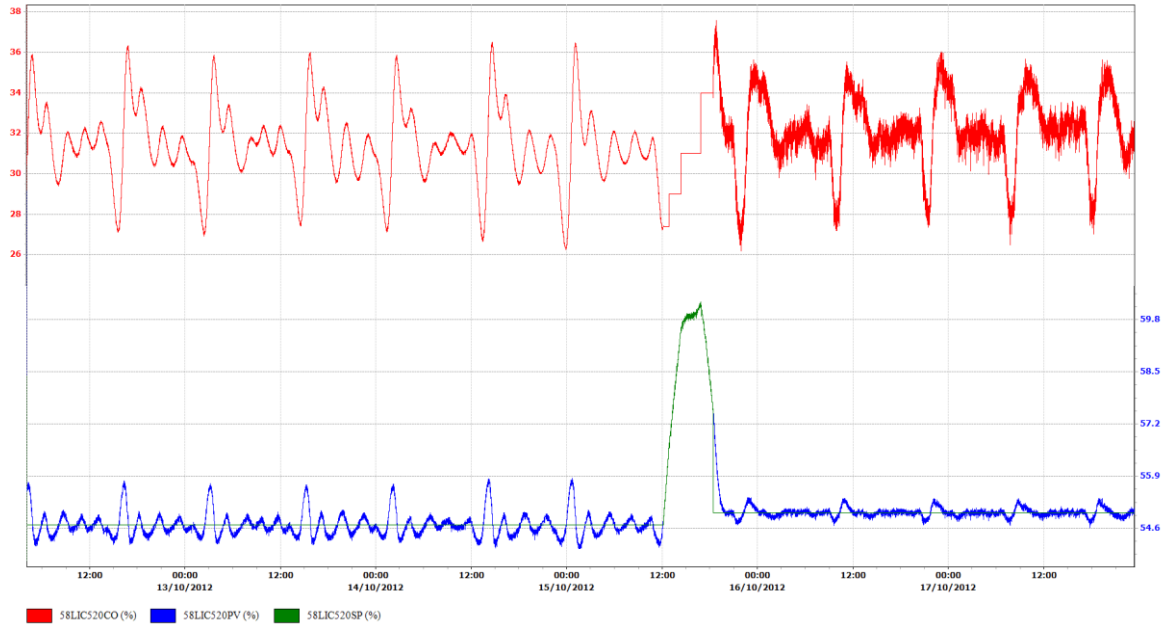
3. Results

The before – and after tuning parameters are shown below

Tuning Parameters	K	K_p	K_i	K_d	K_a	S_{20}
Initial	1.0	2.0	0.2	0	10	0
Final	1.0	10	0.32	0	10	1

(DCS type was ABB)

A before and after trend is shown below:



4. Conclusion

This problematic PID loop has been tuned correctly, allowing the sulphur storage & degassing tank to more efficiently and reject disturbances more effectively.