

# What is Process Control? and Why You Should Care - Industry 4.0

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## BACKGROUND

Industry 4.0 is a term coined at the 2011 Hannover Fair to describe how new technologies available in the 4th Industrial Revolution will revolutionize the organization of global value chains.

This vision is associated with increased productivity, energy efficiency, and sustainability. It was, in consequence, quickly adopted by several sectors of the goods and services industries.

According to the Boston Consulting Group April 2015 Report (1), Industry 4.0 is propelled by nine technologies. Some have made inroads in the chemical processing industry, and some have been part of process control for quite some time now.

## INDUSTRY 4.0 FOR PLANT FLOOR

The message I bring about Industry 4.0 is that although some of the technologies available are going to augment your understanding of processes, no amount of detailed study will replace all uncertainties with certainties (2).

Undoubtedly, there are more powerful tools to augment our analysis capability and more sensors, but “there is no substitute for process knowledge and certainly none for common sense” (3).

This article is a case study that shows that “more=better” is not always true.

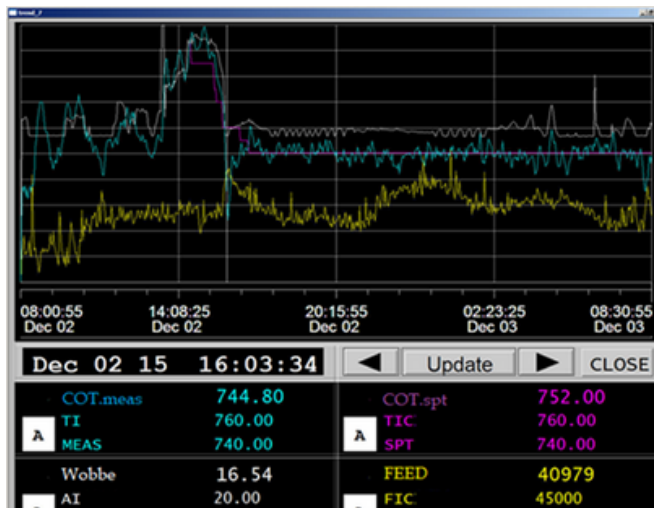


Figure 1 - Fired-heater combustion control performance. Cyan pen: Coil outlet temperature. Purple pen: Coil outlet temperature setpoint. White pen: Wobbe Index. Yellow pen: Crude feed

## CASE STUDY

During the commissioning of combustion control systems for a refinery, I encountered that the engineering design included the typical required process variables:

- coil outlet temperature
- excess O<sub>2</sub> in the flue gases
- volumetric air
- volumetric fuel flow and
- fuel pressure to burner.

With the idea of improving the combustion control they added measurements for:

- air temperature
- fuel molecular weight
- fuel temperature and
- Wobbe Index (Inferred heating value of a fuel gas)

In principle, it could have been a good idea.

However, the added instrumentation increased the points of failure and added complexities that failed to outweigh the benefits.

I proposed simplifying the strategy to the fundamental metered cross-limited combustion control system.

The changes in the strategy were quite successful. Feedback control balancing the fuel and air is capable of rejecting disturbances, such as:

- fuel composition changes
- weather conditions and
- load disturbances.

In Figure 1 I show the proximity of the Coil Outlet Temperature to its setpoint, as evidence of the improvement.

## REFERENCES

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- (3) Shinskey F. G. (1994) A Critique of Education in Process Control, Paper presented at the IASTED Conference on Computers in Industry, Cairo, December.