

A Framework to Structure Operational Documents for Chemical Processes

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ABSTRACT

In the chemical process industry, it is well accepted that operational documents such as operating procedures and manuals are often inadequate and ineffective. As a result, it is widely recognized that these inadequate and ineffective operational documents contribute substantially to the occurrence of plant downtime and often costly and dangerous industrial incidents.

The key reasons for these poor documents are that the original operational requirements from plant owners are not clear, and the fundamental design intentions and design rationales by process designers are not incorporated into these operational documents. This is because the operational design for chemical processes is performed by the process designers during the process design phase, and, in a largely separate exercise, operational documents are created by the plant owners. This decoupling of design and operations means that these documents don't cover all the necessary operation modes and they don't support the design intentions and design rationales.

This paper presents a logical methodology and data structure whereby the key operational design information is carried through into operational documents producing efficient, easily understood and flexible procedural documents that will ultimately result in safe and efficient operations.

To achieve this, first, we identify the clear operational requirements of the plant owners by utilizing the systematized business process model for plant lifecycle engineering that we have developed. Next, we clearly define the business processes of operational design to identify essential and valuable information for plant operation. In particular, with regard to the description of equipment and procedures, we apply the design philosophy of ANSI/ISA-88 to the methodology. (ANSI/ISA-88 is a widely accepted industry standard addressing batch process control). Finally, we integrate these techniques to construct effective, structured operational documents. Documents structured using this methodology reflect all the underlying design intentions/rationales and operation modes and, at the same time are easier to use and easier to maintain. We propose that this will substantially contribute to safer and more efficient operations in industrial sites.

Keywords: Framework, Operational Design, Operational Document, Operating Procedure