



# Case Study

FMECA | A Proven Business  
Improvement Tool in the  
Energy and Utility Industry



MCP Consulting Group Limited  
Blythe Valley Innovation Centre  
Blythe Valley Park  
Central Blvd  
Solihull B90 8AJ

0121 506 9032

[mcpeurope.com](http://mcpeurope.com)

# Failure Modes, Effects & Criticality Analysis



## introduction

If you own, run or maintain a plant, building or factory in any industry, your primary goal will be asset reliability management. Having your assets consistently running will mean less unplanned maintenance, or unexpected downtime. The result will be an increase in production, safer working environments, meeting contract deliverables and of course, maximising profit margins.

Failure Modes, Effects and Criticality Analysis (FMECA) should form an integral part of your asset reliability management regime. It is a well-proven method for identifying issues that may arise, reviewing relevant components of a plant or system to identify failure modes and their corresponding effects. This systematic approach can identify failures, their criticality and facilitate a prioritisation plan for improvement.

MCP has partnered with many clients in the food, drink pharmaceutical and utilities industries to help them establish solid processes, provide training and facilitate FMECA teams to build a successful business improvement programme.

In this Case Study, we explain the challenges faced by one of our clients and how establishing a FMECA process not only solved their main issue but uncovered and resolved others through the process.

## about FMECA

The FMECA process has been adapted in many different ways for many different purposes. It can contribute to improved designs for products and processes, resulting in higher reliability, better quality, increased safety, enhanced customer satisfaction and reduced costs. The process can also be used to establish and optimise maintenance plans for repairable systems and/or contribute to control plans and other quality assurance procedures.

FMECA provides a knowledge base of failure mode and corrective action information that can be used as a resource in future troubleshooting efforts and as a training tool for new engineers.

## the client

MCP has worked with this particular client for 3 years, supporting their Maintenance Excellence Programme, as well as providing reliability and mentoring, training courses and workshops. The company has a global presence, providing a variety of services, including renewable energy and utilities.

Our client required our assistance at one of their UK sites to complete a FMECA exercise. The original remit was to focus on one main output however, this quickly highlighted other issues that also needed to be addressed in order to successfully complete the process and provide the required initial outputs.

The original objective was centred around planned maintenance tasks and how to keep the plant reliable and in compliance with all regulatory requirements.



*Figure 1- Original FMECA outputs*

## original plan

The FMECA project planned to be mainly a tabletop exercise with the Piping and Instrumentation Drawing (P & ID) and Line Diagrams used as its basis.

## initial issues

The first complication came with the fact that the drawings were sometimes difficult to find, were labelled only with numerical codes and with little indication of what system or plant they represented. In many cases they were also out of date, with modifications having been made on site without updating the drawings.

Another issue with the drawings were many items of equipment were not tagged as per the drawing. This needed to be addressed to ensure all equipment was captured which meant a full drawing review to ensure that all relevant equipment was included in the FMECA study. All untagged equipment needed to be tagged (both on the drawings and out in the field) and the drawings updated and stored in a more logical order, with a better naming system allowing the correct drawings to be found easily.



## change of CMMS

The next challenge was a change of CMMS. It had been decided that the company's CMMS was to be changed to a global standard and, the FMECA outputs now had to match the requirements of this new system rather than the system originally envisaged. The data held in the old system was in no fit state to form the basis of the new CMMS.

It was decided that the new CMMS would require a whole new implementation from scratch, requiring a full asset register to be developed along with new tags, in line with the current systems, for the untagged equipment.

Where this did affect the FMECA was in the level of detail that was required. From grouping large groups of similar equipment, it was necessary to use much smaller groups and individualise some of the equipment to allow for a smoother transition to the CMMS. This would then enable a hierarchy model, with system and sub-systems to be built ready for the CMMS upload, based on a modified proprietary tagging system.

The FMECA documents were heavily modified to allow the additional data required for the CMMS, making them almost unrecognisable from the original documents at the beginning of the process.

The drawings were then updated, the naming modified to aid searching and all stored within a logical, hierarchical structure on the company's servers.

## achievements

The modifications made have provided much more than the original maintenance job plans, or the new CMMS structure, hierarchy and easily searchable drawings - **it has provided the basis for a site-wide series of improvements.**

These improvements include the following:

- Significant time being saved, by the maintenance personnel, in searching for drawings when planning and carrying out work.
- This in turn is making the maintenance department more efficient and effective and increasing the time available to plan and schedule jobs into.
- The planned maintenance activities are now based around realistic failure modes and effects and so are more efficient and effective in keeping the plants reliable.
- The up to date drawings make it far easier and safer for the operations department to plan and implement safe schemes of isolations when work is required on-site.
- The drawings are now controlled documents and are all located together so there is only one, up to date source of information.
- New projects are now more easily incorporated into the CMMS as the hierarchy and tagging systems are already designed and in place.
- A site-wide tagging project, that was identified as an action item from a previous audit, can now be carried out simply and efficiently.
- The CMMS is now well structured and contains the correct planned Maintenance activities, making it much more effective and user friendly than the previous incarnation.

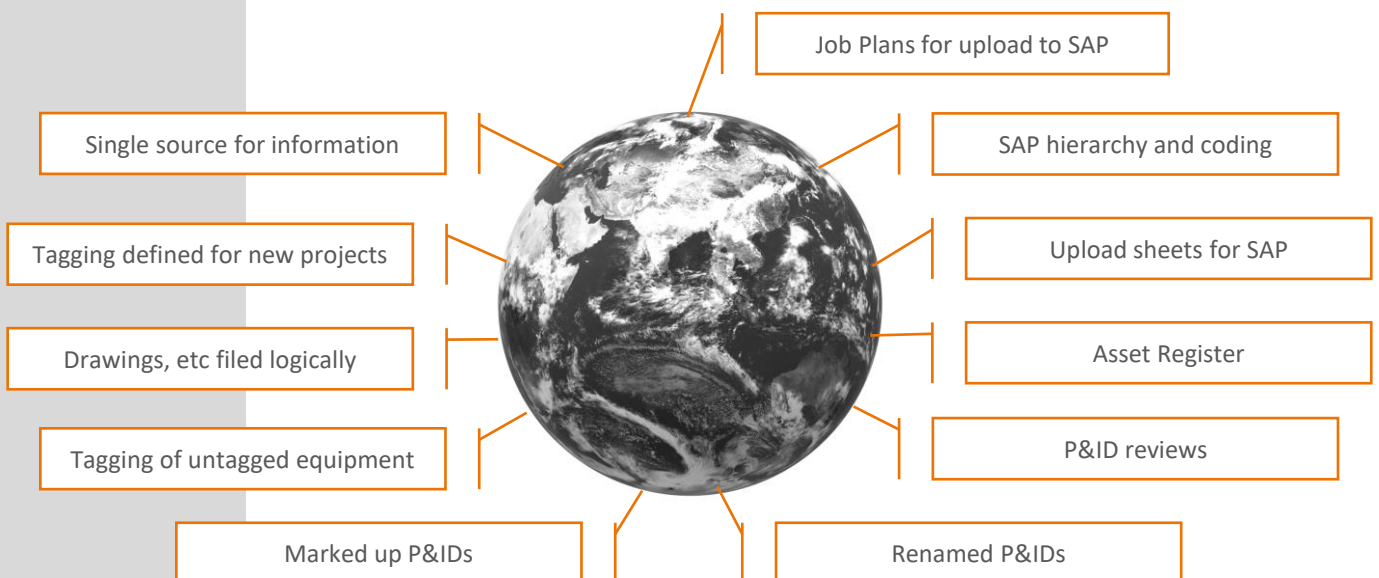
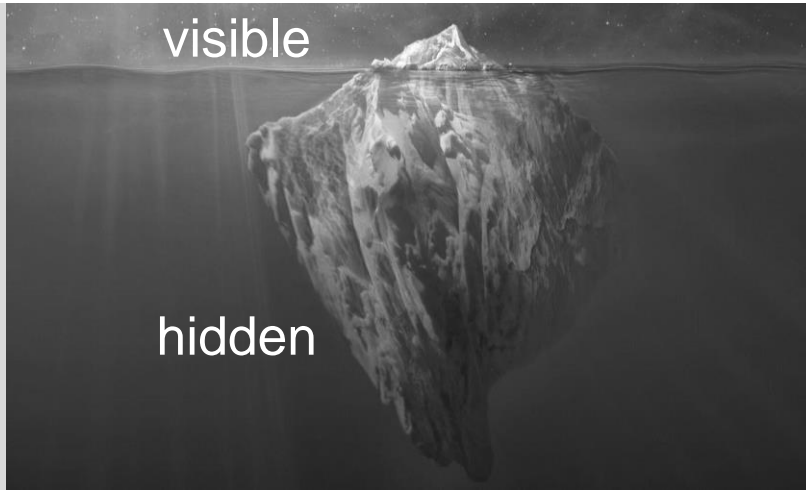


Figure 2- Modified FMECA outputs



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From its original starting point, this FMECA programme has now formed the basis for site wide improvement projects, some of which were not envisaged initially. It has also supported the formation of cross-functional teams that now have a better understanding of how the plants work and how each other's roles impact on the other.

The FMECA provided inputs into improvement processes that had stuttered to a halt for a long time. It kicked them back into life and improved the safety and reliability of the plants and reduced the frustration felt by many of the personnel concerning drawings and information availability.

Spending a little more time and effort took a standard FMECA and changed it into a complete business improvement process that has positively affected the whole of the site.

If you are considering implementing a CMMS or looking to reduce maintenance costs and increase reliability, then a FMECA programme can be the vehicle for achieving this.

## about us

**Are you looking to start a FMECA process, or have already started and uncovered some hidden stumbling blocks along the way, then we can help.**

The MCP Group of Companies was originally established in 1987 providing physical asset management and maintenance consulting and training services to clients on a worldwide basis.

We are focused on supporting our clients' future business objectives and proud that our history has given us the firm foundations upon which to grow and keep pace with industry changes.

Our consultants have the skills to help you each step of the way. They are Institute of Asset Management accredited and can support you in developing better awareness of your strengths and weaknesses, help to create an improvement plan, build capacity and deliver positive business change.



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