



Revealed Risk is Managed Risk

Many of the economic problems we face today can be traced to lax, disillusioned, or perhaps even nonexistent, risk management practices. Not too long ago, we may have been able to offer assurances of project success using simple analyses or anecdotal evidence. Today, project sponsors and stakeholders require greater comfort and confidence before authorizing a new project or continuing a marginal or under-performing project.

by David Elam

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They want to understand project risks, but perhaps more importantly, understand how those risks will be mitigated. Fortunately, tools are available that allow project managers to objectively document, assess, communicate, and manage risks. Although these tools may require an investment of time to understand and implement, the good news is that the skills required for use are easily in reach of environmental project managers and the outputs of those tools are tangible, actionable, and easily communicated to sponsors and stakeholders.

In this article, we'll take a quick look at three tools that can be used to identify and manage risk: the Ishikawa diagram, the risk classification matrix, and failure mode and effects analysis (FMEA). The Ishikawa diagram or risk classification matrix can satisfy the qualitative risk analysis requirements of

many projects. Additionally, Ishikawa diagrams and risk classification matrices may be used to support a FMEA, a process that provides a quantitative analysis of risks. Although these tools are recent additions to the project management profession, they have a long history of use in the quality management area.

An Ishikawa diagram, also known as a "fishbone" or cause-and-effect diagram, is as an easy-to-use qualitative tool for risk assessment that can be used for a project or a project task. It can serve as stand-alone tool or be used in connection with more detailed risk management tools. Figure 1 presents a simple Ishikawa diagram in which the possible causes of a late project report are illustrated. While the Ishikawa diagram provides information about the various potential causes of a project problem, it does not

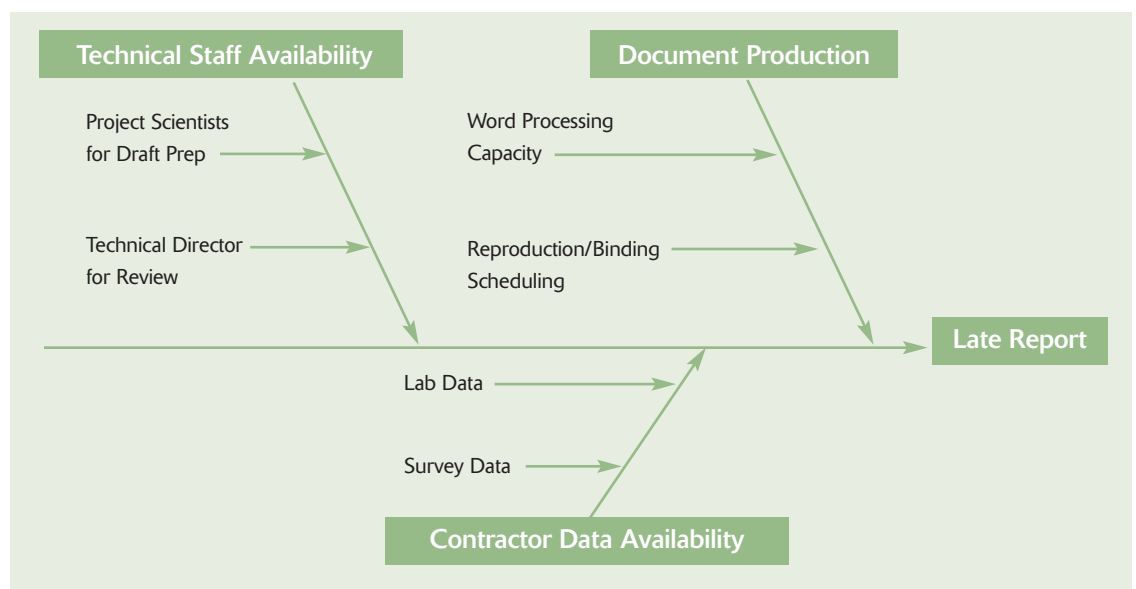


Figure 1. Ishikawa Diagram Showing Factors that Contribute to Risk of Late Project Report

Potential Consequence Low - High	High Consequence Risk with Low Probability of Occurrence	High Consequence Risk with High Probability of Occurrence
	Low Consequence Risk with Low Probability of Occurrence	Low Consequence Risk with High Probability of Occurrence
	Probability of Occurrence Low - High	

Figure 2. Sample Risk Classification Matrix

provide information about the relative importance or probability of occurrence of those causes.

Risk classification matrices are familiar tools used to easily and visually communicate the relative effects of potential causes of project problems. In a two-by-two matrix, one axis is used to describe risk severity and the other is used to describe probability of occurrence. Figure 2 illustrates the construction of a two-by-two matrix for evaluating project risk. While this method is easy to develop and interpret for simple scenarios, it is less effective when used to classify multiple risks or distinguish “shades of gray.” A three-by-three matrix can be constructed by adding a “moderate” category to both axes.

FMEA offers a more sophisticated approach to evaluate and rank project risks and can address the entire project or the complete sequence of activities associated with it. FMEA was developed in the late 1940’s by the U.S. military for use on complex defense projects. Today, the process is routinely used in a range of manufacturing and service processes to eliminate failures or defects during both planning and implementation phases. Increasingly, FMEA is used to identify and manage risks in new or proposed projects and develop recovery strategies. In summary, FMEA involves the following steps:

1. A cross-functional team examines the project or project task and identifies potential ways in which either can fail. The result is a collection of “failure modes.” If FMEA is used as a remedial action, known failure modes as well as potential failure modes are identified.
2. Potential or known causes are identified for each failure mode.
3. Each failure mode is ranked according to how

serious the consequences are (severity), how often it occurs (occurrence), and how easily it can be detected (detection). Ranking scales for each factor are provided. A scale of 1-10 is convenient but other scales can be used.

4. A Risk Priority Number (RPN), reflecting the product of severity, occurrence, and detection, is developed for each failure mode. Using a scale of 1 to 10 for each of the three factors yields RPNs ranging from 1 to 1000, providing clear guidance for prioritizing mitigation actions.
5. The project delivery process is re-engineered beginning with failure modes with the highest value RPNs.

For a complex process, FMEA can take thousands of labor-hours and months to complete. For a less sophisticated process, a FMEA can be completed with a few, well-planned meetings of knowledgeable team members. FMEA data can be easily captured in a spreadsheet and it is often convenient to record planned corrective actions for each cause of a failure mode along with the revised scores.

As environmental professionals, we can expect more scrutiny about our understanding and management of project risks. And even though we may have significant experience with certain types of projects, processes, or clients, there are always risks and complacency is the easiest way to fall victim to them. These tools offer systematic approaches to objectively document, manage, and communicate risks. Incorporating them into project proposals or project status reports demonstrates a grasp of potential problem areas, instills confidence that problems will be resolved, and provides information that supports day-to-day project management efforts. **em**

References

1. Tague, Nancy. The Quality Toolbox, Second Edition, ASQ Quality Press, 2005, pp. 247-251.
2. Lock, Dennis. Project Management, Ninth Edition, Gower Publishing, Limited, 2007, pp. 101-103.
3. Ramu, Govind. FMEA Minus the Headache, Quality Progress, March 2009, pp. 36-42.

