

*Potential Failure Mode
and Effects Analysis
For Tooling & Equipment*

Machinery FMEA
Second Edition



**POTENTIAL
FAILURE MODE AND
EFFECTS ANALYSIS
FOR TOOLING AND EQUIPMENT**

MACHINERY FMEA

Reference Manual
Second Edition

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FOREWORD

2nd Edition

The MFMEA 2nd Edition is a reference manual to be used by suppliers to Chrysler LLC, Ford Motor Company, and General Motors Corporation as a guide to assist them in the development of both Machinery (Tooling and Equipment) FMEAs. The manual does not define requirements; it is intended to clarify questions concerning the technical development of MFMEAs. The content of this document is the replacement for SAE J1739, 2002 Section 5. Potential Failure Mode and Effects Analysis for Machinery should be used by suppliers as specified by Customer Requirements.

This manual is aligned with and is intended to be a supplement to the FMEA 4th Edition.

Summary of Changes in the 2nd edition MFMEA Reference Manual

The MFMEA methods described in the 2nd edition MFMEA Reference Manual include those associated with design at the machinery system, subsystem, interface, and component levels.

General Changes

- The formatting used in the 2nd edition is intended to provide easier reading.
 - An index is included.
 - Icons are used to indicate key paragraphs and visual cues are used.
- Additional examples and verbiage have been provided to improve the utility of the manual and to provide a closer tie into the FMEA process as it develops.
- Reinforcement of the need for management support, interest, and review of the FMEA process and results.
- Define and strengthen the understanding of the linkage between MFMEA and PFMEA as well as defining the linkages to other tools.
- Improvements to the Severity, Occurrence, Detection ranking tables so that they are more meaningful to real world analysis and usage.
- Alternative methods are introduced that are currently being applied in industry.
 - Additional appendices which have example forms and special case application of FMEA.
 - The focus on the “standard form” has been replaced with several options that represent the current application of FMEA in industry.
- The suggestion that RPN not be used as the primary means for assessing risk. The need for improvement has been revised including an additional method, and the use of thresholds on RPN is clarified as a practice that is not recommended.

Chapter I provides general FMEA guidelines, the need for management support and having a defined process for developing and maintaining FMEAs, and the need for continuous improvement.

Chapter II describes the general application of the FMEA methodology, which is common between MFMEA and PFMEA processes. This includes the planning, strategy, action plans, and the need for management support and responsibility in FMEAs.

Chapter III focuses on MFMEA (Design Failure Mode Effects and Analysis), establishing the scope of the analysis, use of block diagrams, various types of MFMEAs, formation of the teams, basic procedure for analysis, action plans, and follow-up, alternatives to RPN, and connection to PFMEAs and validation plans.

Chapter IV focuses on PFMEA (Process Failure Mode Effects and Analysis), establishing the scope of the analysis, use of flow diagrams, formation of teams, basic procedure for analysis, action plans, the connection to MFMEAs and the development of control plans.

The **Appendices** have several examples of forms for DMFEA and PFMEA and addresses different applications and procedures for addressing design and process risk.

The Supplier Quality Requirements Task Force would like to thank the following individuals, and their companies, who have contributed their time and efforts to the development of this edition of the FMEA Reference Manual:

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William Hagen, Ford Motor Company
Rebecca Snyder, Ford Motor Company
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Gregory Gruska, Omnex

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Chapter I

General MFMEA Guidelines