Reliability Maturity Matrix

Table 6.1 Pro Series

	Stage 1: Uncertainty	Stage 2: Awakening	Stage 3: Enlightenment	Stage 4: Wisdom	Stage 5: Certainty
Requirements & Planning	Informal or nonexistent.	Basic requirements based on customer requirements or standards. Plans have required activities.	Requirements include environment and use profiles. Some apportionment done. Plans have more details with regular reviews.	Plans are tailored for each project and projected risks. Use of distributions for environmental and use conditions.	Contingency planning occurs. Decisions based on business or market considerations. Part of strategic business plan.
Training & Development	Informally available to some, if requested.	Select individuals trained in concepts and data analysis. Available training for design engineers.	Training for engineering community on key reliability-related processes. Managers trained on reliability and lifecycle impact.	Reliability and statistics courses tailored for design and manufacturing engineers. Senior managers trained on reliability impact on business.	New technologies and reliability tools tracked and training adjusted to accommodate. Reliability training supported.
Analysis	Nonexistent or based on manufacturing issues.	Point estimates and reliance on handbook parts count methods. Basic identification and listing of failure modes and impact.	Formal use of FMEA. Field data analysis of similar products used to adjust predictions. Design changes cause reevaluation of product reliability.	Predictions are expressed as distributions and include confidence limits. Environmental and use conditions used for simulation and testing.	Lifecycle cost considered during design. Stress and damage models created and used. Extensive risk analysis performed as needed.
Testing	Primarily functional.	Generic test plan exists with reliability testing only to meet customer or standards specifications.	Detailed reliability test plan with sample size and confidence limits. Results used for design changes and vendor evaluations.	Accelerated tests and supporting models used. Testing to failure or destruct limits conducted.	Test results used to update component stress and damage models. New technologies characterized.
Supply Chain Management	Selection based on function & price.	Approved vendor list maintained. Audits based on issues and critical parts. Qualification primarily based on datasheets.	Assessments and audit results used to update AVL. Field data collected and failure analysis performed related to specific vendors.	Vendor selection includes analysis of vendor's reliability data. Suppliers conduct assessments and audit of their suppliers.	Changes in environment, use profile, or design trigger vendor reliability assessment. Part parameters and reliability monitored for stability.
Failure Data Tracking & Analysis	May address function testing failures.	Pareto analysis of field return and internal testing. Failure analysis relies on vendor support.	Root cause analysis used to update AVL and prediction models. Summary of analysis results disseminated.	Focus is on failure mechanisms. Failure distribution models updated based on failure data.	Customer satisfaction relationship to failures is understood. Prognostic tools used to forestall failure.
Validation & Verification	Informal and based on individuals rather than process.	Basic verification that plans are followed. Field failure data regularly reported.	Supplier agreements around reliability monitored. Failure modes regularly monitored.	Internal reviews of processes and tools. Failure mechanisms monitored and used to update models and test methods.	Reliability predictions match observed field reliability.
Improvement	Nonexistent or informal.	Design & process change processes followed, corrective action taken.	Effectiveness of corrective actions tracked over time. Identified failure modes addressed in other products. Improvement opportunities identified as stresses and use profiles change.	Identified failure mechanisms addressed in all products. Advanced modeling techniques explored and adopted. Formal and effective lessons-learned process exists.	New technologies evaluated and adopted to improve reliability. Design rules updated based on field failure analysis.
Understanding & Attitude	No comprehension of reliability as a management tool. Tendency to blame engineering for 'reliability problems.'	Recognizing that reliability management may be of value but not willing to provide money or time to make it happen.	Still learning more about reliability management. Becoming supportive and helpful.	Full participation. Understanding of absolutes of reliability management. Recognizing their personal role in continuing emphasis.	Consider reliability management an essential part of the company system.
Status	Reliability is hidden in manufacturing or engineering departments. Reliability testing probably not done. Emphasis on product functionality.	A stronger reliability leader appointed, yet main emphasis is still on an audit of initial product functionality. Reliability testing still not performed.	Reliability manager reports to top management, with role in management of division.	Reliability manager is an officer of the company, reporting effective status and devising preventive action and involved with consumer affairs.	Reliability manager is on the board of directors. Prevention is the main concern. Reliability is a thought leader.

Reliability Maturity Matrix

Table 6.2 Enthusiast Series

	Stage 1: Uncertainty	Stage 2: Awakening	Stage 3: Enlightenment	Stage 4: Wisdom	Stage 5: Certainty
Requirements & Planning	Informal or nonexistent.	Basic requirements based on customer requirements or standards. Plans have required activities.	Requirements include environment and use profiles. Some apportionment done. Plans have more details with regular reviews.	Plans are tailored for each project and projected risks. Use of distributions for environmental and use conditions.	Contingency planning occurs. Decisions based on business or market considerations. Part of strategic business plan.
Training & Development	Informally available to some, if requested.	Select individuals trained in concepts and data analysis. Available training for design engineers.	Training for engineering community on key reliability-related processes. Managers trained on reliability and lifecycle impact.	Reliability and statistics courses tailored for design and manufacturing engineers. Senior managers trained on reliability impact on business.	New technologies and reliability tools tracked and training adjusted to accommodate. Reliability training supported.
Analysis	Nonexistent or based on manufacturing issues.	Point estimates and reliance on handbook parts count methods. Basic identification and listing of failure modes and impact.	Formal use of FMEA. Field data analysis of similar products used to adjust predictions. Design changes cause reevaluation of product reliability.	Predictions are expressed as distributions and include confidence limits. Environmental and use conditions used for simulation and testing.	Lifecycle cost considered during design. Stress and damage models created and used. Extensive risk analysis performed as needed.
Testing	Primarily functional.	Generic test plan exists with reliability testing only to meet customer or standards specifications.	Detailed reliability test plan with sample size and confidence limits. Results used for design changes and vendor evaluations.	Accelerated tests and supporting models used. Testing to failure or destruct limits conducted.	Test results used to update component stress and damage models. New technologies characterized.
Supply Chain Management	Selection based on function & price.	Approved vendor list maintained. Audits based on issues and critical parts. Qualification primarily based on datasheets.	Assessments and audit results used to update AVL. Field data collected and failure analysis performed related to specific vendors.	Vendor selection includes analysis of vendor's reliability data. Suppliers conduct assessments and audit of their suppliers.	Changes in environment, use profile, or design trigger vendor reliability assessment. Part parameters and reliability monitored for stability.
Failure Data Tracking & Analysis	May address function testing failures.	Pareto analysis of field return and internal testing. Failure analysis relies on vendor support.	Root cause analysis used to update AVL and prediction models. Summary of analysis results disseminated.	Focus is on failure mechanisms. Failure distribution models updated based on failure data.	Customer satisfaction relationship to failures is understood. Prognostic tools used to forestall failure.
Validation & Verification	Informal and based on individuals rather than process.	Basic verification that plans are followed. Field failure data regularly reported.	Supplier agreements around reliability monitored. Failure modes regularly monitored.	Internal reviews of processes and tools. Failure mechanisms monitored and used to update models and test methods.	Reliability predictions match observed field reliability.
Improvement	Nonexistent or informal.	Design & process change processes followed, corrective action taken.	Effectiveness of corrective actions tracked over time. Identified failure modes addressed in other products. Improvement opportunities identified as stresses and use profiles change.	Identified failure mechanisms addressed in all products. Advanced modeling techniques explored and adopted. Formal and effective lessons-learned process exists.	New technologies evaluated and adopted to improve reliability. Design rules updated based on field failure analysis.
Understanding & Attitude	No comprehension of reliability as a management tool. Tendency to blame engineering for 'reliability problems.'	Recognizing that reliability management may be of value but not willing to provide money or time to make it happen.	Still learning more about reliability management. Becoming supportive and helpful.	Full participation. Understanding of absolutes of reliability management. Recognizing their personal role in continuing emphasis.	Consider reliability management an essential part of the company system.
Status	Reliability is hidden in manufacturing or engineering departments. Reliability testing probably not done. Emphasis on product functionality.	A stronger reliability leader appointed, yet main emphasis is still on an audit of initial product functionality. Reliability testing still not performed.	Reliability manager reports to top management, with role in management of division.	Reliability manager is an officer of the company, reporting effective status and devising preventive action and involved with consumer affairs.	Reliability manager is on the board of directors. Prevention is the main concern. Reliability is a thought leader.

Reliability Maturity Matrix

Table 6.3 Intro Series

	Stage 1: Uncertainty	Stage 2: Awakening	Stage 3: Enlightenment	Stage 4: Wisdom	Stage 5: Certainty
Requirements & Planning	Informal or nonexistent.	Basic requirements based on customer requirements or standards. Plans have required activities.	Requirements include environment and use profiles. Some apportionment done. Plans have more details with regular reviews.	Plans are tailored for each project and projected risks. Use of distributions for environmental and use conditions.	Contingency planning occurs. Decisions based on business or market considerations. Part of strategic business plan.
Training & Development	Informally available to some, if requested.	Select individuals trained in concepts and data analysis. Available training for design engineers.	Training for engineering community on key reliability-related processes. Managers trained on reliability and lifecycle impact.	Reliability and statistics courses tailored for design and manufacturing engineers. Senior managers trained on reliability impact on business.	New technologies and reliability tools tracked and training adjusted to accommodate. Reliability training supported.
Analysis	Nonexistent or based on manufacturing issues.	Point estimates and reliance on handbook parts count methods. Basic identification and listing of failure modes and impact.	Formal use of FMEA. Field data analysis of similar products used to adjust predictions. Design changes cause reevaluation of product reliability.	Predictions are expressed as distributions and include confidence limits. Environmental and use conditions used for simulation and testing.	Lifecycle cost considered during design. Stress and damage models created and used. Extensive risk analysis performed as needed.
Testing	Primarily functional.	Generic test plan exists with reliability testing only to meet customer or standards specifications.	Detailed reliability test plan with sample size and confidence limits. Results used for design changes and vendor evaluations.	Accelerated tests and supporting models used. Testing to failure or destruct limits conducted.	Test results used to update component stress and damage models. New technologies characterized.
Supply Chain Management	Selection based on function & price.	Approved vendor list maintained. Audits based on issues and critical parts. Qualification primarily based on datasheets.	Assessments and audit results used to update AVL. Field data collected and failure analysis performed related to specific vendors.	Vendor selection includes analysis of vendor's reliability data. Suppliers conduct assessments and audit of their suppliers.	Changes in environment, use profile, or design trigger vendor reliability assessment. Part parameters and reliability monitored for stability.
Failure Data Tracking & Analysis	May address function testing failures.	Pareto analysis of field return and internal testing. Failure analysis relies on vendor support.	Root cause analysis used to update AVL and prediction models. Summary of analysis results disseminated.	Focus is on failure mechanisms. Failure distribution models updated based on failure data.	Customer satisfaction relationship to failures is understood. Prognostic tools used to forestall failure.
Validation & Verification	Informal and based on individuals rather than process.	Basic verification that plans are followed. Field failure data regularly reported.	Supplier agreements around reliability monitored. Failure modes regularly monitored.	Internal reviews of processes and tools. Failure mechanisms monitored and used to update models and test methods.	Reliability predictions match observed field reliability.
Improvement	Nonexistent or informal.	Design & process change processes followed, corrective action taken.	Effectiveness of corrective actions tracked over time. Identified failure modes addressed in other products. Improvement opportunities identified as stresses and use profiles change.	Identified failure mechanisms addressed in all products. Advanced modeling techniques explored and adopted. Formal and effective lessons-learned process exists.	New technologies evaluated and adopted to improve reliability. Design rules updated based on field failure analysis.
Understanding & Attitude	No comprehension of reliability as a management tool. Tendency to blame engineering for 'reliability problems.'	Recognizing that reliability management may be of value but not willing to provide money or time to make it happen.	Still learning more about reliability management. Becoming supportive and helpful.	Full participation. Understanding of absolutes of reliability management. Recognizing their personal role in continuing emphasis.	Consider reliability management an essential part of the company system.
Status	Reliability is hidden in manufacturing or engineering departments. Reliability testing probably not done. Emphasis on product functionality.	A stronger reliability leader appointed, yet main emphasis is still on an audit of initial product functionality. Reliability testing still not performed.	Reliability manager reports to top management, with role in management of division.	Reliability manager is an officer of the company, reporting effective status and devising preventive action and involved with consumer affairs.	Reliability manager is on the board of directors. Prevention is the main concern. Reliability is a thought leader.