



## ■ Critical Issues

1. The increase in complexity and systemization of product functions has promoted the division of work and many system interfacing problems occurring at the time of system integration.
2. While there is a demand for reduction in the development period, and shortened product lifecycles, our design technique innovation is insufficient to respond to these demands.
3. Increased use of software in product functions, and outsourcing, have contributed to expansion in the scope of process management and hollowing-out of technology.
4. Following the increase in items required legally, and those demanded by customers, it is difficult to simultaneously deliver expansion of assessment items such as environmental assessment/periods, and reduction in development lead-time.

## ■ JMAC Concept

- **To innovate design quality, JMAC develops a design process plan with application of various methods, and adopts the best methodology.**
- **Beyond understanding of innovation methods, JMAC aims to develop the innovation scenario based on QC (Quality Control) thinking, and establish technology that is workable.**

### ■ Five key points for design quality innovation:

1. Overall design process structure  
Design each process, clarifying the QC (Quality Control) Assessment function (Design review management) for the design process.
2. Design quality planning  
Plan to prevent design quality defects at the beginning of the development (planning) stage
3. Prevention of design quality defects  
Detect design defects, and take preventive measures.
4. Scenario establishment for the work of the persons in charge  
Enabling engineers to develop design quality by themselves and to build verification scenarios
5. Concurrent issue solving  
Supply tips for collecting the know-how of experts, and methods for effective team operation.

# Product Design Quality Innovation

Specification quality and design quality improvement



## JMAC Features

In this design quality innovation program, in order to improve the design quality (specification quality and design quality), the design development methods (tools) described below are used effectively, and a development process is constructed for implementing the design operations systematically.

Category	Method	Utilization Outside the Design Division
Quality Planning	Planning to Framework Design - Specification fixed/variable analysis - Staged target method - Software clean room technique - Strategic concept catalog method - D-FMEA - Advanced specification and process efficiency - Outsourcing/alliance management	- Specification fixed/variable analysis (evaluation and testing item identification) - Staged target method (in-advance clarification of manufacturing issues) - Strategic concept catalog method (field support policy investigation) - P-FMEA (in-advance clarification of manufacturing issues) - Advanced specification (in-advance clarification of manufacturing issues)
Incorporating Quality in Each Design Phase	Framework Design to Detailed Design - Issue management table - Q-MAP method - Synchronization of fixed/variable analysis and Q-MAP method - Condition diagram - Coding rules	- Issue management table (Used for progress management of critical items) - Q-MAP method (Clarification of areas where defects are occurring)
Prior Verification (Including defect prevention)	Basic Design to Detailed Design - DR mechanisms, innovations, check-list advancement - Source code application - Review report management - Bug density curve application method - Advance evaluation method - V-shaped development and advance evaluation	- DR mechanisms, innovations, check-list improvements (design linkage) - Source code application (defect trend management) - Bug density curve (statistical management of software design completion level) - Review report management (statistical management of layout completion level) - In-advance evaluation method (in-advance verification of design and evaluation items)
Defect Improvement (review)	Design Completion to Planning - Problem analysis - T-shaped matrix diagram method - Development process review analysis (Including review of each process)	
Foundation (Overall)	- Statistical technique foundation (QC 7 tools, new QC tools, etc.) - ISO 9000S application - Concurrent development - Issue definition	

- Methods that can be applied both to hardware and software designs   ■ Methods that can be applied to software designs

## Results

The purpose and anticipated results of design quality innovation activities are as follows:

1. Quality brand protection (elimination of problems at user sites)
2. Reduction in number of problems (establishment of root cause solving method) and problem definition at the earlier stage (establishment of disturbance outflow prevention method).
3. Development process innovation (Ex. Construction of design internal verification system, concurrent development system establishment)
4. Education of an autonomous development team and engineers (employees with dual thinking style)

For implementation of the consulting:

Regarding implementation of the consulting, based on general ideas on its purposes and expected results, JMAC verifies and sets appropriate concrete targets (attainable standards with clear deadlines) and indexes for each client.