ANNEXURE – XI

EXTRACTS OF MODEL SUGGESTED BY ALIREZA LARI

A conceptual intelligent decision support systems (DSS) model for ISO 9001:

By looking to the information requirement type of the modules (of ISO 9000), it can be concluded that the information and data processing are not sufficient to handle ISO 9000, and in many cases, analytical processing capabilities are required. The strategy, directives, structure, requirements, and other details of all ISO 9000-based quality systems are defined by preparing quality policy, quality manual, and quality plan documents. Based on these documents, the necessary procedures and working instructions are prepared and maintained. These documents set the quality information requirements of the processes within each firm, and the processes will make a chain throughout the organisation. Some of these processes such as maintenance, calibration, and training are considered as supporting processes. The quality records collected from the system, through the quality audit and other means of data collection, should be entered into the corrective and preventive actions module. This module is in charge of suggesting proper correction and preventive actions and is directly related to the management review module. Figure below shows the flows and relations of building modules for a quality management integrated information system. According to the processes and information requirements (of ISO 9000), many of the modules should be designed as intelligent decision support systems to include some elements of artificial intelligence beside the model base management system.

Figure above shows the structure of the integrated information system. In the construction of this system, a prototyping approach has been followed. The prototyping approach aims at building a DSS in a series of short steps with immediate feedback from users to ensure that development is proceeding correctly. As is shown in the Figure, one of the most important modules of this system and any quality assurance system, in general, is the corrective and preventive action module. Corrective action is the process of documenting audit findings so that they can be remedied; therefore, this module is selected as the first prototype.

The flow process of the corrective and preventive action (CPA) is as follows:

1. Quality Standards, Quality manual, and Quality plans
2. Procedures & Working Instructions
3. Primary Module: SRM, WH, Design, Production, CRM
   Supporting Modules: Maintenance and Calibration, and Training
4. Quality Control Records Module, Quality audit
5. Corrective & Preventive Actions
6. Management Review
(1) Collect problem reports from quality control records module (that connects to different sources including customers, suppliers, internal quality audit, process, incoming goods and service, final inspections, quality meetings, management meetings, different departments, etc.) and internal quality audits. Each finding requires a corrective action request (CAR). Similar findings are grouped into one CAR. CARs are also available on-line at different sources of data collection.

(2) Register all the problems with the relevant information in a log file. The source of quality problems and other information are also registered. Findings are categorised as follows:
- Major (systematic, critical) - a complete breakdown in an element of the quality management system (QMS); or
- Minor (isolated) - single lapse of a requirement.

(3) CARs are addressed to the responsible manager.

(4) Query the database to find if there is any record about similar cases and solutions. This is a file in the database that includes all the previous problems and their respective solutions. If the problem is a repeated one, then the solution will be automatically drawn from the database. The data stored for each nonconformity are: what was the symptom? What was the symptomatic cure? What was the apparent cause? What was the fix? What was the corrective action? What was the root-cause?

(5) Refer the unsolved problems to a quality council, which uses the components of CPA-DSS and different available tools such as expert systems, neural networks, decision support systems, cause and effect analysis, fault tree analysis (FTA) and fault mode effect analysis (FMEA) to recommend the proper corrective and/or preventive course
of action. The quality council is established to provide overall direction. The council is composed of the chief executive officer (CEO), the senior managers of the functional areas, and a coordinator. In the process of finding the appropriate corrective and preventive action, there are four primary improvement strategies: repair; refinement; renovation; and reinvention. Choosing the right strategy for the right situation is critical.

(6) Keep track of the suggested solutions and the follow-ups. CARs are kept open as long as the root cause of the problem has not been found. A continuous follow up is in place until all action items are closed and the results of the corrective actions are validated. The prescribed root-cause analyses should be completed and results documented. Priority is placed on the response to the CAR and closure of the case.

(7) Update the system and the data in the databases.

(8) Evaluate the system constantly.

(9) Refine, expand and modify the system in cycles.

The components of this CPA-DSS are:

- The database management systems;
- The model base management systems;
- The user interface; and
- The knowledge management.

Some of the potential benefits of developing and implementing an integrated information system for ISO 9000 quality system are listed below:
• Ensures successful ISO 9000 and other quality standards certification by providing an efficient documentation, control and retrieval system.
• Provides support for decision makers in semi-structured and unstructured situations, on quality matters, bringing together human judgment and computerised information.
• Provides the people (who are related to quality functions) with the expertise they need to continuously improve the quality through access to timely and effective tracking and control information.
• Simultaneously centralises and distributes the control of corrective and preventive actions to identify the problems and recommend proper actions based on inputs from all parties involved.
• Provides management with the tools to control the quality of the system, and measures its progress. It also makes the management aware of the bottleneck and weak points of the system.
• Provides the specialists with the tools and models they need to identify and analyse the problems in order to be able to share the models with each other.
• Increases the efficiency of the quality assurance system.
• Reduces the amount of paper work.
• Assists the group work and joint quality improvement projects