Elements of Effective Maintenance Management

There are many elements of affective maintenance management whose effectiveness is the key to the overall success of the maintenance activity. Some of these elements are described here.

Maintenance Policy: maintenance policy is one of the most important elements of effective maintenance management. It is essential for continuity of operation and a clear understanding of the maintenance management program, regardless of the size of a company.

Usually, maintenance organizations have manuals containing items such as policies, programs, objectives, responsibilities and authorities for all levels of supervision, reporting requirements, useful methods and techniques, and performance measurement indices.

Work order system: A work order authorizes and directs an individual or group to perform a given task, a well-defined work order system should cover all the maintenance jobs requested and accomplished, whether repetitive or a one-time job.

The work order system is useful for management in controlling costs and evaluating job performance. The work order should at least contain information such as requested and planned completion dates, work descriptions and its reasons, planned start date, labor and material costs, work categories, and appropriate approval signatures.

Job planning: Job planning is an essential element of the effective maintenance management. A number of tasks may have to be performed prior to commencement of a maintenance job; for example, procurement of parts, tools, and materials, identification of methods and sequencing, coordination with other departments, and securing safety permits. Past experience indicates that on average one planner is required for every 20 craftspersons.

Human errors in maintenance:
Humans play an important role during the equipment lifecycle in the design, production, and operation and maintenance phases.

Human error may be defined as the failure to perform a specified task (or the performance of a forbidden action) that could lead to disruption of scheduled operations or result in damage to property and equipment.

Some of the causes of human error include:

- poor equipment design
- poor work environment
- poor work layout
- Improper work tools
- inadequate training
- poorly written equipment maintenance and operating procedures

Guidelines for reducing human error and maintenance:

over the years considerable effort has been made to develop guidelines to reduce human error in airline maintenance.

Many of these guidelines can also be used in other areas of maintenance.

The guidelines covered 10 areas:

- procedures
- human error risk management
- tools and equipment
- design
- supervision
- communication
- Shift handover
- towing aircraft
- maintenance incident feedback

Procedures are covered by 4 guidelines:

1. ensure as much as possible that standard work practices are followed all across maintenance operations.
2. Periodically review documented maintenance procedures and practices to ensure they are all accessible, realistic and consistent.
3. Periodically examine work practices to ensure that they do not differ from formal procedures.
4. Evaluate the ability of checklists to assist maintenance persons in performing routine operations such as preparing an aircraft for towing, activating hydraulics, or moving flight services .

There are three guidelines concerning human error risk management:

1. carefully considered the need to disturb normally operating systems to perform nonessential periodic maintenance inspections, as there is a risk of maintenance error occurrence associated with a disturbance.
2. Formally review the adequacy of defenses such as engine runs designed into the system for detecting maintenance errors.
3. Avoid as much as possible the simultaneous performance of the same maintenance task unsimilar redundant systems.

The following guidelines are associated with training:

- Consider introducing crew resource management for maintenance professionals and others, i.e. persons interacting with the maintenance professionals.
- Offer periodic refresher training to maintenance professionals with emphasis on company procedures:

Important guidelines concerning design:

- Ensure that manufacturers give proper attention to maintenance of human factors during the design process and actively seek information on the errors occurring during the maintenance phase for the input in the design phase.

A guideline in the area of supervision and management oversight needs to be strengthened particularly in the final hours at each shift as the occurrence of errors becomes more likely.

In the area of communication, ensure that satisfactory systems are in place to disseminate important information to all maintenance staff so that changing procedures or repeated errors are considered in an effective manner. Shift handover can be a factor in maintenance error.

In the area of towing aircraft or other equipments, review the procedures and equipment used for towing to and from maintenance facilities.

Maintenance incident feedback is covered by the following guidelines:

- ensure that management receives regular and structured feedback on maintenance incidents with particular consideration to the underlying conditions or latent failures that help promote such incidents.
- Ensure that engineering training schools receive feedback on recurring maintenance incidents so that effective corrective measures for these problems are targeted.

Quality of Safety in Maintenance:

Good quality maintenance work leads to good results - reduction or elimination of unexpected failures, lower costs, better safety, increase confidence in work performance, etc.

Good quality maintenance work in only be measured accurately after the specification of expectations. Once the aim of maintenance work is clearly identified, steps such as those listed below can be useful in producing good quality maintenance work.

Steps to producing good quality maintenance work:

- limit perplexity. Often the request for maintenance is incomplete and inaccurate.
- Define goals. Goals should be set by the maintenance team and its supervisors. Ensure that the team clearly understands the objectives for the maintenance work prior to start.
- Avoid unsafe practices. Do not permit temptation to minimize maintenance time by shortcutting prescribed safety procedures
- Do not overlook secondary damage. Ensure that less dramatic secondary problems are not overlooked. Otherwise they could be costly at a later stage.
- Report as the maintenance work progress is. Report all relevant information that could be useful for performing similar tasks in the future.
- Do not use second-hand parts. Ensure that failed parts are replaced by new ones.
- Reinstall with extra care period sometimes excessive force use and re installation can damage parts. Avoid introducing new failures while correcting old ones.
- Test the repaired items prior to its hand back.
- Complete all appropriate job records. Tasks such as maintenance planning comma and failure analysis rely heavily on an effective maintenance history.