

IMPROVING RELIABILITY-BASED MAINTENANCE CULTURE IN PRINTING PLANTS

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Abstract: In several aspects, maintenance organization relies on the results of organization sciences, and therefore the results, correlations surfacing during the analysis and examination of organizational cultures may as well be applicable to this field of studies. Cultural elements can be clearly linked to the maintenance strategic model elaborated by the authors, thus demonstrating that the improvement of maintenance efficiency and changes in certain elements of the organizational culture can be assigned to each other. The authors have worked out correlations and methods, conducted studies to see how in contrast with the reactive (troubleshooting) maintenance approach the foresighted reliability culture can be made a part of the corporate culture at printing businesses, what steps, procedures are needed for a successful change.

Key words: corporate culture, reliability, maintenance of printing plants.

1. Scope of the research

With a focus on the development of maintenance organization, as part of a larger work we assessed the situation of maintenance in printing industry maintenance, at Hungarian printing enterprises in 2003 and 2004. A series of questionnaire-based surveys conducted with the involvement of professionals working in the examined field formed the basis of the assessment. With respect to the production value created, the survey could be performed at 26 of the 30 largest printing companies. At that time, these printing enterprises represented approximately 60% of the registered production volume of the sector. All the competent maintenance managers – altogether 67 people – responded to our questions. From the “private soldiers” of maintenance, we sought for and received answers from almost 20% of the representatives of the profession.

This questionnaire-based survey of the existing conditions tried to reveal the situation of maintenance in printing industry at that time, the professional preparedness and organization of these activities, technical facilities, expectations and the foreseeable tendencies of development [2].

Some of the questions in the survey also concerned problems relating to corporate culture, and the responses implied that in printing industry – including maintenance – traditions, the printer attitude and insistence on well-established ways of behaviour. It was apparent that major internal changes took place at the company, accompanied by a change in the culture. These factors have motivated us to examine whether the available means of organizational culture can contribute to the efficient adoption of the reliability-centered orientation in maintenance. Hereunder, our associated researches are presented.

2. Methodology of the research

When we were framing our integrated maintenance model, we considered all those means and abilities that were needed for the betterment of maintenance, expected to allow the implementation of efficient foresighted maintenance management in printing industry, and at the same time comprised the elements of the structuring of our maintenance model.

Some of these elements belong to *hard means* or *hard skills* as they are called in Anglo-Saxon technical literature. They cover all those knowledge, professional contents, abilities that are needed for the performance of foresighted maintenance. They include tangible means such as professional and time planning, the performance of operating and stewardship tasks, condition monitoring, failure analysis, servicing know-how and so on.

Key abilities or in English terminology “soft skills” are not associated with the given profession, but rather successful work. On the other hand, there are so-called “intangible” characteristics, behavioural patterns and practices; long-term plans, short-term goals, personal management, communication and cooperation, problem solving and the assumption of responsibilities, learning skills and capabilities, team work, performance and evaluation skills.

Figure 1 shows how the pyramid of “hard” skills is built upon the foundation formed by the “soft” key abilities. Nevertheless, the deep foundation of both these types of skills is in fact the organizational culture. In the light of this attitude, the structuring of the corporate culture should unavoidably be associated with the development of a maintenance model.

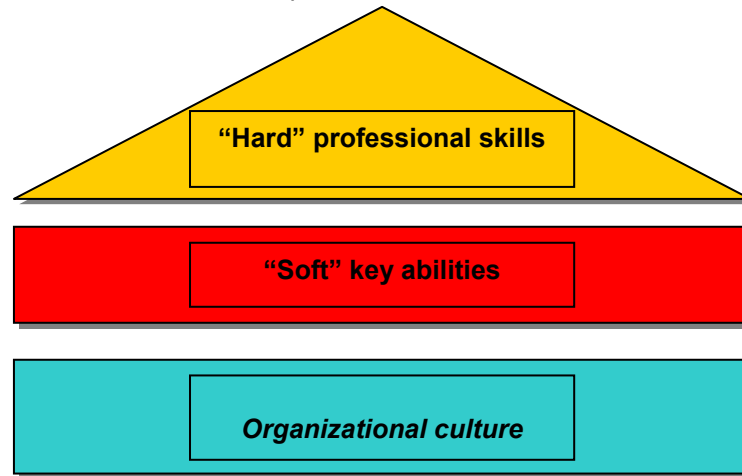


Figure 1: The pyramid of means and abilities stands on a foundation formed by organizational culture [3]

It has been examined how the reliability-centered culture can be incorporated into the work processes of the improvement of maintenance organization, how it is based on this maintenance model.

The interpretation of the reliability-centered attitude is demonstrated via ways of behaviour matched up and described in Figure 2 and 3.

Engineer Culture Change	
Mechanic	Technician
Lone ranger	Works in a team
Lubrication (if there is sufficient time)	Technically demanding
Inspection (if there is sufficient time)	Diagnostic and forecast
Troubleshooting panic	Works along time plans
Repeat breakdowns	Specialist of the given field
Permanent stress, but not a challenge	Challenging, but not stress

Figure 2: Repair-oriented and reliability-centered culture of engineers [1]

Today, the execution of maintenance tasks calls for a technician of independent and synthesized thinking rather than a repair-oriented workfellow who tends to lean back and regard himself to be a hero after any successful troubleshooting.

Management Culture Change	
Repair servicing administrator	Engineering manager
Get it fixed	Why did it break?
Work acceptability	What caused the work?
How much does it cost?	What caused the costs?
Inflexible in the face of budget constraints	To review the investment and planning
When will something break again?	Can do we prevent it?
Survived another week	How do we improve?

Figure 3: Repair-oriented and reliability-centered culture of maintenance management [1]

Similarly, completely different mentality and requirements are valid for a manager who plans maintenance with respect to reliability in comparison with a leader always waiting for the following day to come.

In the processes of maintenance organization, proper attention should be paid to supporting the forms of behaviour described in the right columns.

3. Structuring of a reliability-centered culture

Changes are always induced by economic factors, it is never the culture that itself “demands” change. In our case, the necessity to change the maintenance strategy is the main drive behind the change of the culture.

The control of the efficiency of the steps of change calls for the selection of such a cultural model where the concept of measurability can also be interpreted properly.

The cultural model suggested by Thomas (Thomas, 2005) assumes the existence of correlations among the eight concepts used in change management: the elements of change and the four fundamental elements of organizational culture as provided in *Figure 4*.

A scoring system can be worked out for the evaluation of the 8 elements of changes in the organizational culture model. The properties of the 32 correlations shown in *Figure 4* can be measured with tests. From the positive statements describing these correlations a test can be compiled. The responses can be evaluated via the grades of agreement pertaining to the elements of culture and focusing on the positive statements in view of the elements of changes, in a scale of 5 grades. The given responses can be summed up and evaluated towards the direction of the elements of changes. As a consequence, the tests to be compiled should minimally consist of 32 questions or the multiple of 32 questions.

Eight Elements of Change	Four Elements of Culture			
	Values	Role Models	Rites & Rituals	Cultural Infrastructure
Leadership	M	M	M	m
Work Process	M	M	M	m
Structure	M	m	M	m
Group Learning	M	M	m	m
Technology	M	M	M	m
Communication	M	M	M	M
Interrelationships	M	M	m	M
Reward	M	M	m	m
M – Major Interaction		m – minor interaction		

Figure 4: Correlations of the organizational culture and the elements of changes [3]

With respect to the foregoing, such a questionnaire of 32 questions has been worked out that is suitable for testing our status and progress in the structuring of a reliability-centered maintenance culture. The test is based on the 8 pillars of the change of culture, in view of the four elements of culture. The responses and thus the extent of satisfaction reflect positive trends. In this case, the evaluation can be interpreted in a scale of 20 points in relation to each element of change.

The questionnaires can be processed, and the changes can be evaluated with the use of ordinary web or column charts. The direction of changes indicates our further orientation that we should take in our work of culture building.

As an example, below the statements from the questionnaire concerning structural issues are provided.

31. It is clear for everyone that reliability and maintenance affect the entire operation of the company.

32. The necessary structural changes always influence maintenance management.

33. The structure of the company (hierarchical order) corresponds to the regular activities determined by the work processes of maintenance.

34. The company’s management system minimizes the effects caused by whispering and corridor information exchange.

Figure 5 presents a situation assessment made in relation to a real maintenance workshop and shows the average changes of the reliability culture based the answers of 3 managers and 9 workers.

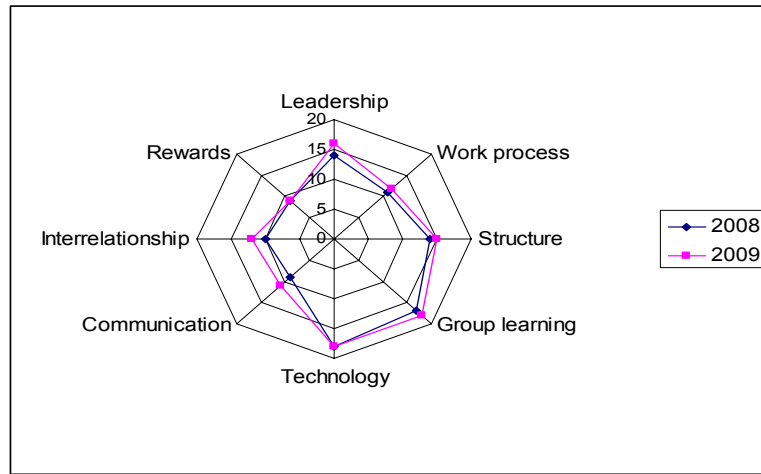


Figure 5: Evaluation of the changes of organizational culture in a web chart

4. Conclusion

An important and brand new element of the maintenance organization model is the maintenance reliability culture structuring module (Figure 6) that relies on the results of the questionnaire-based assessment (culture test), and thus provides for a framework of continuous development and the secure sustainment of the achievements made. It calls for a novel approach, and is incorporated into all the organizational processes represented by information and managerial chains, relations. We have tested this method in 10 printing companies. The used it with success to test and improve their reliability culture.

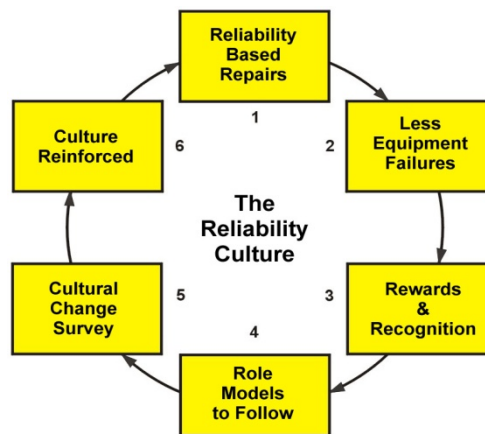


Figure 6: Model for the improvement of the maintenance culture at the printing businesses

5. Literature

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