DOWNTIME REDUCTION
A PROFITABLE ROAD TO SUCCESS

- PART 2 -
THE DOWNTIME REDUCTION PHILOSOPHY
AND
HOW TO GAIN THE NECESSARY DATA

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In part 1 – The financial impact of downtime reduction – we presented the basic economics to visualize the enormous effect of uptime improvement on profit. Herefore we used the parameters of a small solid board mill as an example. The figures showed a remarkble profit increase of over € 400.000,-- yearly for every percent point less downtime. In part 2 and 3 we present how to realize this kind kind of improvement.

3 Philosophy of downtime reduction

3.1 Downtime reduction process

Reducing downtime continuously requires good information followed by appropriate action. By studying all necessary steps a process model has been derived. This process is shown in the flowchart of figure 3.

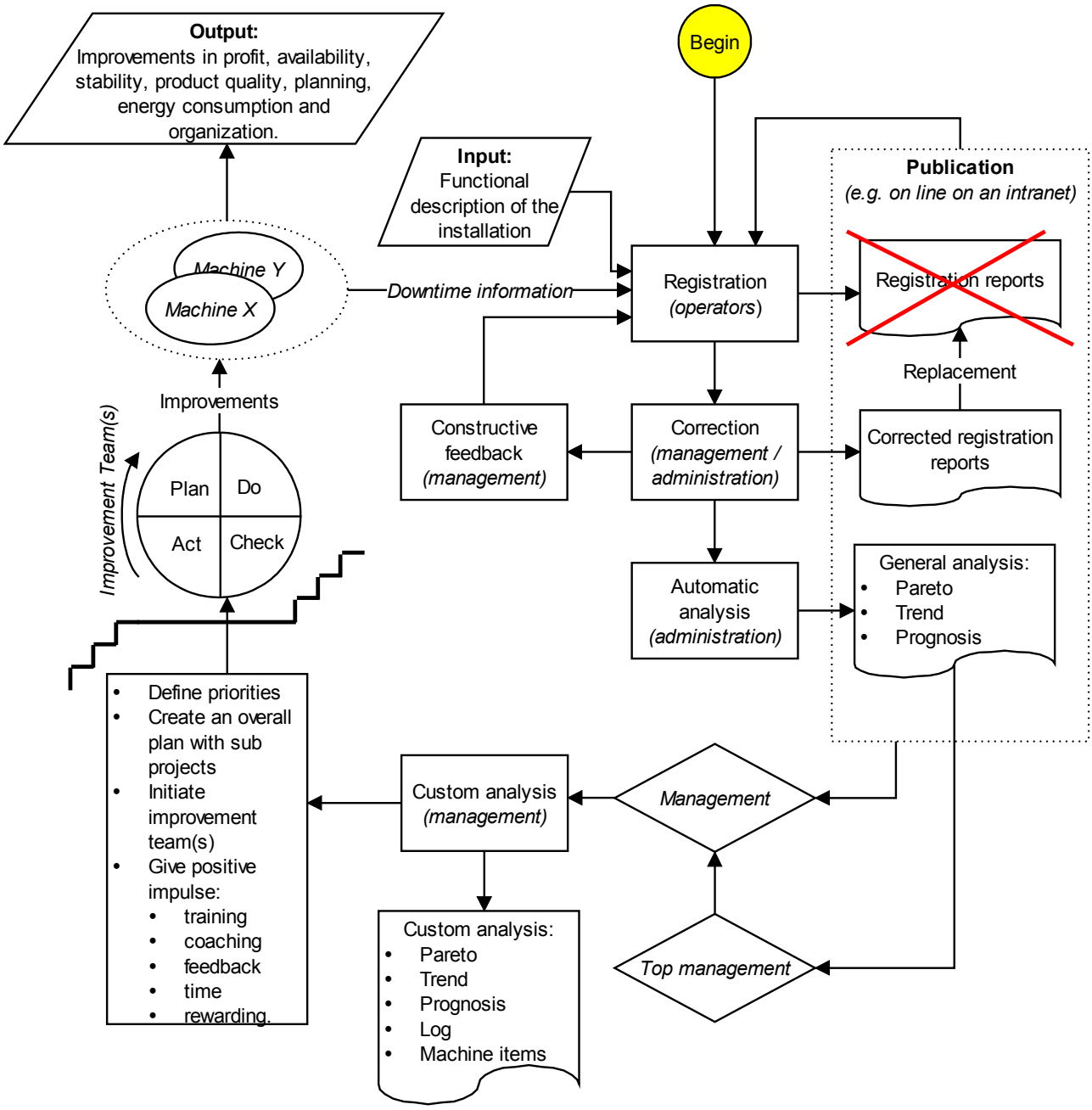

Figure 3: Downtime reduction process

Recognizing that downtime reduction should be seen as a process, is a first but very important step towards achieving the defined goal. It opens for example the way to use proven strategies like Business Process Improvement (BPI) for effective and efficient improvement. Of course each step of the process is accompanied by conditions to be able to obtain the desired output. Generally speaking this process can only function well if all people involved have the tools and conviction to communicate well and work together carefully. Hence the human factor plays an important role in the registration, analysis and improvement phase.
The next chapters elaborate further on the process steps of the flowchart and the process conditions.

3.2 Functional approach (to the production installation(s))

Besides the importance of a process oriented approach to downtime reduction an essential element in our philosophy is the description of the production process in terms of functions as much as possible.

Each step within the production process, each operation on the product can be seen as applying a function to the product. And each function can be seen as the result of two or more sub functions and so on. In this way the production process can be visualized as a rafter diagram: the main production process is the backbone, the branches are functions and sub functions. This detailisation continues over a grey area where geographical definitions transform into root-causes. e.g. a possible 'leaf' could be named: “Glue supplies not delivered”.
Having such a description all malfunctions can now be assigned to a function which cannot properly be performed. The more details are known about the cause, the deeper the registration of the malfunction and its root-cause can take place.

This viewpoint of the process has the following advantages:

- It does not require detailed knowledge of applied technology. Technical and business administrative information melts together. The information becomes multi functional, it:
    - is also understandable for non-technicians. This improves the knowledge of, and the communication between different disciplines in finding solutions;
    - makes it possible (for higher) management to benchmark different sites by analysing the processes on higher levels (one of the principles of world class manufacturing);
- Because no difference is made between technical and production dependable malfunctions, the often unhealthy 'competition' between departments like Technical Services and Production (and their budgets) disappears. The integration of these departments will improve.
- After replacement of process machinery, only the deeper levels of the tree need to be adapted. On the higher functional level nothing will change. Hence there will be no gap in the analysis of the installation.

This functional definition of the production process will be very useful in the registration step of the downtime reduction process and is crucial for the analysis step.

3.3 Scope of the process

To prevent misunderstandings it is useful to pay attention to the scope of the downtime reduction process. The downtime reduction process:

- focuses on the production process and closely linked supporting processes like stock preparation and energy supply.
- is generally not supported by maintenance software. Maintenance software is mainly a tool to manage the costs of the maintenance department. One of the types of data maintenance software tries to collect, is the time worked on a certain part. This part can be a spare part and working on it does not stop the machine from producing.
- is seldom really supported by the process computer, ERP and other logistic or production administrative systems. One of the functions of ERP software is to collect information (e.g. production amounts) on the process during uptime of the production facility. Rarely detailed information is collected on machine status when failures occur. One can say that ERP focuses on the uptime part. Downtime reduction software focuses on the downtime part. This is schematically shown in the figure 4.

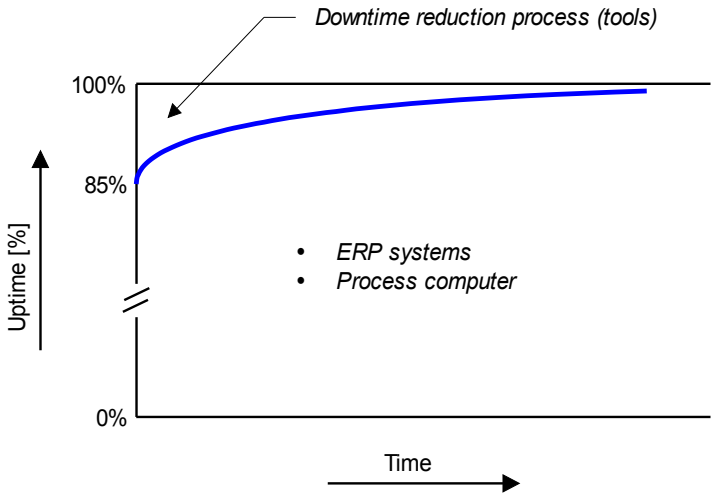

Figure 4: Focus of downtime reduction process and tools

4 Gaining essential process failure information

Without meaningful and solid data about the amount and causes of downtime (failures, stoppages, unacceptable quality deviations), it is impossible to perform any analysis whatsoever (figure 5). So gaining data and verifying it are the first steps to be taken.

Figure 5: Appropriate action requires reliable data

4.1 Registration

In an ideal situation a machine would be fully equipped with sensors that could notice any failure in the process and register it in a central database. For a very long time this will stay a utopian scheme though. Maybe by time this author is atomised, there will be systems and sensors that can relate a problem at process end to an operators failure somewhere else. Until then it is necessary to keep using 'the human sensor', formed by the people on the work floor who manage the process.
To minimize the amount of work and maximize the quality of the registered data a software tool should be provided that guides the operator step by step in the composition of each registration of downtime. Therefore the following demands should be put on this composition process:

- time, duration and production team should be described.
- inconsistent and impossible registrations should be prevented. Using a functional description of the installation to which specific downtime is linked, can for example do this.
- the depth should be left flexible: it should be left upon the operator in how much detail (depth) the failure can be described (one cannot describe what is not known (yet)). Quality goes before quantity.
- there should be an option to enter remarks on the failure. A remark can be used to clarify the failure in more detail, to give the assumed root cause of the failure, to give a possible solution to prevent the problem in the future and so on.
- should be performed close to the machine (eventually at more than one registration point).
- it should be quick and simple and not hamper the actual process by asking to much from the operator.

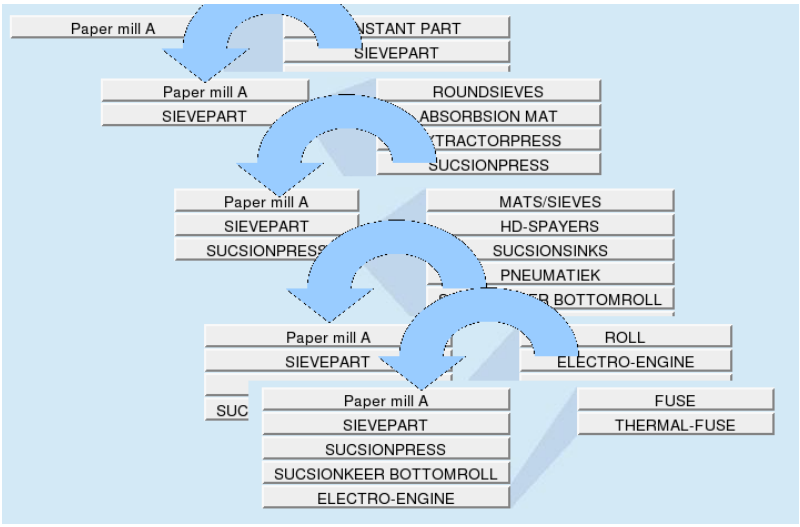

Figure 6: Selecting a function or machine part to register failure on production

Figure 6 gives an example of a few steps registering a failure in a section of the registration screen as implemented in the S&S MIS.

To ensure optimal use of the collected data, the data should be published and be available on-demand. Despite the fact that this today is no longer a technical hurdle, lots of companies are reluctant to implement this technology.

4.2 Correction and feedback

In some situations it is necessary to verify the registered data later with other production data that in the mean time has become available from other systems (production administration) and/or discussions about the production process (production management). This verification may lead to corrections being made to the original registered data.

Tools to perform this correctional step quickly and easily, should be part of the supporting software. After this correctional step the already published data has to be replaced by the corrected data to inform people correctly.

Besides correcting collected data it is of course useful to continuously improve the registration process itself. Giving the operators feedback regularly will keep them motivated to register downtime as well as they possibly can. Feedback can be given in two ways.
First it is important that operators see that data they collect is being used. This can for example be realized by not only publishing the registered and corrected data, but also some graphs that result from analysing these data.
Secondly production management should coach operators in a positive way to improve the way they register downtime. Production management can obtain a clear picture of the quality of the registered data by comparing these data with information from the productive administration and their own general impression after having studied some analysis reports.

Unless an effective feedback system exists, measurement is a waste of time, effort and money. In other words: measurement is the lock - feedback is the key. Without their interaction the door to improvement cannot be opened.

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In part 3 we will convert the gained data into clear objective information and mention some conditions to take corrective actions leading to more uptime.