Professional Process Technology

Company profile of divis intelligent solutions GmbH

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divis

intelligent solutions

Introduction

Divis offers professional support for different kinds of processes. In order to assist you in a suitable way, we are concerned to regard not only partial aspects, but the system as a whole. Our focus lies on process analysis and optimization, generation of customized solutions and implementation of a suitable sensor technology into existing systems. The necessary support is also included. Of course, our methods always conform to the current standard.

Quality management — benefits of thorough process monitoring

A process analysis provides a good overview of the qualitative condition of a production process because it shows whether the production targets are met and whether this is done efficiently. It is thus of great use for the process management.

The aim of a process inspection is the complete description of each single production step. Such an analysis reveals deficiencies and proposes suitable improvement measures. Furthermore, it describes the relevant process parameters and their dependencies. Due to such knowledge the process can efficiently be monitored and optimized.

Thus, a process analysis serves to ensure and enhance the quality capability of a company and to show their production potential. This sort of quality management is also a proof of performance, for example, toward customers or a certification company.

Who we are

In our company we combine the knowledge from different areas. Our team consists of:

Computer scientists	Statisticians	Engineers	University professors

Furthermore, we have built up a reliable network of partners, who support us interdisciplinarily.

What makes us special

- Global optimization: we take a look at the whole process chain, from raw material to the final product (including several process steps and the resulting intermediate product).
- We connect data validation with a suitable sensor technology to guarantee the generation of a useful data set.
- We are an independent company who works solution oriented, not product oriented.
- We bring many years of experience in industrial programming.
- Due to our good connections to universities and research projects our knowledge and technology is always up to date.
- We offer a reliable tool for data analytics — ClearVu Analytics.
- We offer robust models with all common algorithms.
- We cover the whole process from data acquisition to a customized presentation of results.
- Our partners complement our competences for an optimal support.

Forms of analysis

There are different forms of analysis, for example, system-, process-, or product analysis. An analysis is not limited to one of these forms, but can always be extended by other methods like a problem analysis. Each form differs from the others concerning content and study depth.

Purpose and objectives

Product analysis
- Evaluation of the efficiency of already existing QM-measures at specific products.
- Evaluation of product quality concerning the target specifications.
- Determination of improvement measures.

Process analysis
- Evaluation of the efficiency of already existing QM-measures at specific processes.
- Evaluation of the quality capability.
- Determination of improvement measures.

System analysis
- Evaluation of the efficiency of an already existing QM-system.
- Determination of weaknesses, correction- and improvement measures.

The decision for one form depends on the objective. The system analysis offers an overview about the efficiency of a QM-system, and it reveals whether it meets the desired requirements.

In case there already is a functioning QM-system, we can focus other objectives. The main focus shifts from standardization to optimization of processes and products. The analytical methods you use now are:
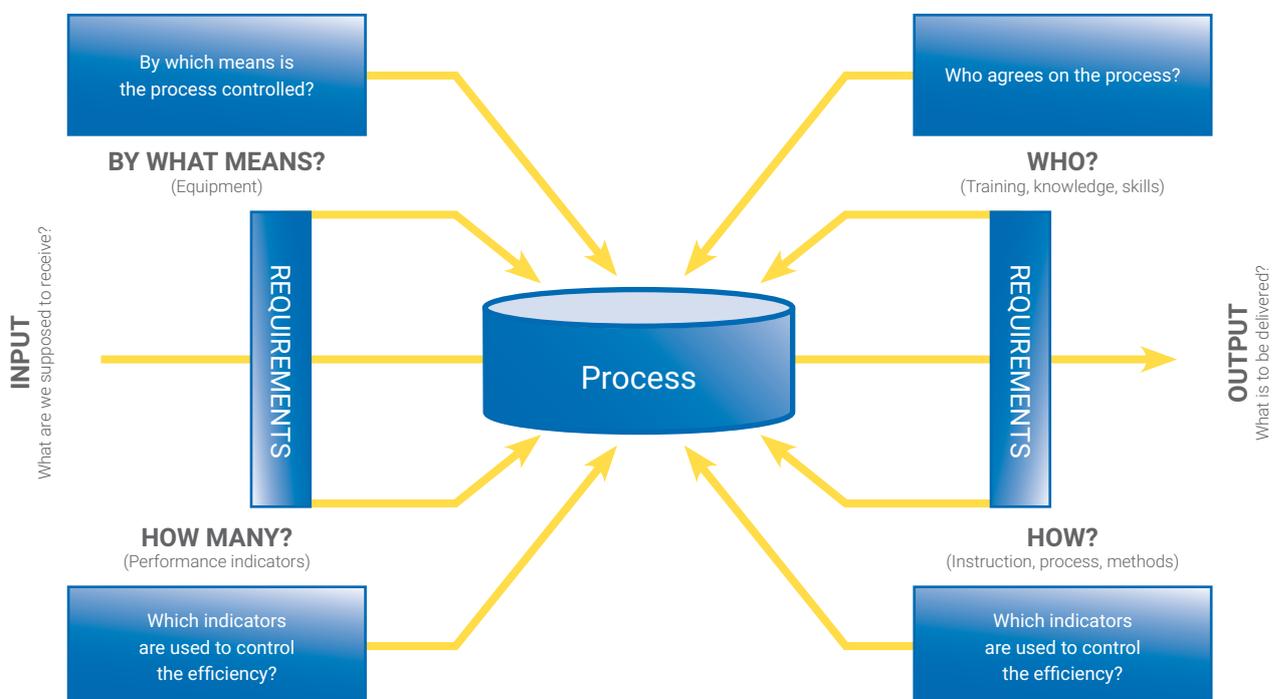

Fig. 1 factors that influence the process

General structure of a process analysis

For the purpose of a better evaluation and structure the process analysis will be divided into six successive steps which have to be executed in this specific order. At the end of each step you get a summary of the results which usually contains sufficient information to improve the production process significantly.

Due to the division into several steps and milestones, the expenses, benefits and results are always transparent for the customer as well as for the provider. After each milestone customer and provider discuss about the next steps and together they decide whether any elements have to be modified.

1. Planning stage

The aim of the planning phase is to provide a solid data base for evaluation and decision making in order to set up an appropriate optimization concept. The main task in the planning stage is therefore the determination of the current condition of the production process and the evaluation of possible ways to realize a general process analysis. For this purpose, we will collect information concerning building components, materials, production processes, locations and staff deployment.

2. Installation, networking and inspection of data sources

During this step, all sensors will be implemented into the production process. This includes: input station for manual input, networking of the sensors, and connection to data bases holding the measurement data. The degree of the networking depends on the time frame available for the raw data acquisition.

After the startup and a short test phase each sensor and each data source will be checked with a statistical evaluation. These individual evaluations ensure that the data sources will later provide reliable results and that they are suitable concerning interference immunity, range of values, resolution, exactness and time response.

The time effort and the expenses for this check can be determined by the amount of data and the expected working time. According to the production area, the sensors will be combined to sensor groups. The sensors within one group form a minimal combination and display the production progress within this area.

3. Process data acquisition

Based on the sensor technology mentioned above, the data acquisition will be supervised by one or more employees, dependent on the complexity of the measurement concept. Among other tasks, these specialists conduct the manual measurements and load the results into the data storage. During the process data acquisition the sensors will be checked by simple statistical data evaluations to ensure the proper function of the measurement system. Data provided by the customer will be tested on their conformity, and afterwards converted and transmitted to the process data base.

The required time and expense for the process data acquisition can be determined by the time frame and the amount of sensors.

4. Evaluation and analysis of the process data

After the data acquisition the data will be analyzed offline. For this purpose, the data recorded by the sensors are cleaned from outliers and measurement errors, and are then used for the model building. During the modeling process the system creates technical process images which show the correlation between process values and results (correlation analysis).

The sensitivity analysis reveals the process values which influence the result the most. Those values are then used as a basis for a subsequent process monitoring. The correlation analysis shows to what degree the different models are able to show the actual proceedings. Furthermore, it allows an optimization of the measurement concept. For this purpose, the amount of the process values for the modeling is varied and the accordance to the actual results is checked. The correlation analysis shows the dependencies of the process values on one another related to the resulting values. This is the basis for an efficient process optimization and very important for the benefit of this method.

Additionally, the process capability and the measuring tool capability are evaluated. There is also the option to conduct other evaluations. The data evaluation is based on statistical methods combined with the models of different algorithms. The software tools we use for these calculations are products from divis intelligent solutions GmbH and R. The required time and expenses for the data evaluation will be calculated based on the amount of sensors and the amount of the needed models, i.e. input values.

5. Optimization of the single process stages

Global Optimization:
The optima which serve as a measuring scale for the production process are determined by evolutional strategies. Also controversy target values like maximal throughput at minimum energy consumption can be calculated. In this case, the system proposes different compromises and also shows the advantages and disadvantages of each solution.

6. Final Report

The final report is based on the analyzed data and briefly summarizes the findings for each target value. For each model there will be a list of the conducted analyses including their results. Important dependencies are visualized in charts.

Based on the realized measurement and software concept a suitable measurement concept for a fixed installation and the related expenses will be determined. Finally, the results will be evaluated concerning the superordinate task formulation, also regarding the feasible measurement concepts.

The expenses for the report will be calculated based on the amount of target values.

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