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Industry 4.0: A Chance for Sustainability and Efficiency

Opportunities, potential risks and side effects of a visionary revolution

Does the textile industry require "Industry 4.0"? Whilst the production of textile goods has led to the first industrial revolution in the 18th century, the actual trend was initiated by the German government in order to increase the overall efficiency. Having said so, this new revolution is no child of the industry, but a vision that needs to be brought up in the years to come. And that's a good thing to have. Even for the textile industry. Or: Especially for the textile industry. Is it really the case?

A majority of the textile units have grown over the time. Modern investments with sophisticated machines are standing side by side with machines, which would be the main attraction in every textile museum. Though those machines with lots of modifications, are unique in many ways. Sometimes they've been designed by the production manager together with the machine manufacturer according to the specific requirements especially for this unit. Unfortunately, in most of the cases neither the production manager nor the machine supplier is available any more. But due to the specific arrangements these machines often deliver a competitive edge for the textile producer, as they're carrying the experience of many decades in their DNA. This DNA is also hard to copy, which is another big point for the old machines. The big disadvantage though is that they cannot communicate with other machines or the management control system installed.

This is exactly where Industry 4.0 offers some assistance. The change in the textile production chain is based upon the fact, that every producer is operating independently but with the ability to communicate with each other. And no machine must be left behind especially not the ones with a lot of experience. The exchange has to involve every link of the value added chain. Only if the entire workflow from beginning to the end is of a constant high quality, the final product can meet the high demands that are required these days. And only by knowing exactly what to do, the production can be optimized and efficiency as well as profit can be increased.

Importance of user interface

In the textile industry modern process control systems are constantly collecting data by means of the corresponding sensors. Closed loop systems use this data in order to optimize the individual process parameters like speed, residual moisture or fan speed. Thus, the stenter output will be optimized. The "Theory of Constraints" states that the overall output of any production unit can only be as high as the slowest production unit. In many companies the drying capacity is reflecting exactly this bottle neck, which means by opening this bottle neck, the output of the entire production may be increased simultaneously. All they need is a proper process management as well as the right interfaces and the production manager will be able to access the machines from all over the world. Mandatory: Internet and the right OPC-UA connection.

In this way sophisticated machines, sensors and process control systems are only one mouse click away from the individual data of the ageing machines on the production floor.

Bearing in mind the development of the smart phones and the handling thereof the "look-and-feel" of the user interface is becoming more important. According to the individual needs of the operator pick count, residual moisture, fan speed or dwell time can be put into focus. In order to make sure, that the final product is always straight, skew and bow distortion also should be displayed. However, where to find the different information and in which dimension it is displayed on the 12 inch touchscreen is only defined by the operator himself.

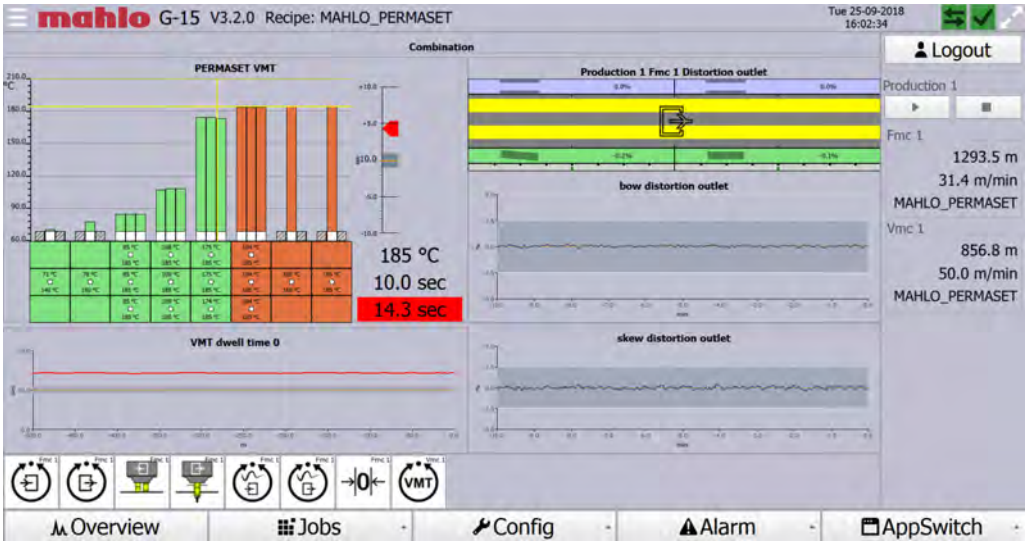

Fig. 1: G 15 Visual

Chances and risks

The perfect process control is not only increasing quality, efficiency and profit. The management by data is also an insurance against claims or rejects, as long as they're not rectified. If a company is operating on different locations, the necessary parameters can be exchanged easily and made available wherever is needed. This helps to establish and maintain necessary standards all over the world, leading to the same quality of the final product, irrespective of the geographical location of the production facility. This saves a lot of time in the lab and brings the linked entities closer to "100% right first time".

With all the positive effects of the networking in between the different machines of the textile value added chain, there are also some risks that are well worth talking about. The "WannaCry" malware and all kinds of spyware need to be mentioned at the top of the list when it comes to potential hazards of the internal company network. This means that no longer the Lab and Colour kitchen are totally responsible for achieving outstanding quality. The future of the textile production will be defined by IT people. Small entities, not having the capacity of recruiting sufficient labour force in this aspect need to liaise with service providers specialized in this field. This leads to dependencies as well as a presentation of individual Know-How, that leave most of the management with an awkward feeling.

Saving money and energy by data connection

Those side effects should not cover the fact that the identification of the textile goods along the value added chain brings a lot of benefits. The clear language of data also means that any kind of safety margin can be eliminated. All the energy wasted for a slightly over-dried fabric can be saved and the heat setting process will be finished after 12 instead of estimated 15 seconds. This clear line not only saves money by an increased efficiency, it also helps to preserve the environment as no unnecessary energy is wasted. The extra transparency in the different segments helps to get a little smarter each day. This is the ideal basis for total quality control and improvement, resulting in better margins and enhanced living environment.

Sustainability is always based upon awareness. This awareness requires information. On the production floor, sensors and control systems are providing this data. Industry 4.0 makes sure, that the data is distributed in time to the right places. With the right data and the related process capability it is easy to make the right decision for the company and for the planet. With all the information just received the reply to the

question raised in the beginning can only be - Yes. Textile production desperately needs Industry 4.0. Having said that, we should rather ask ourselves when and how to start. With or without the support of the German government networking will play an increasingly important role in our day to day working life. Besides the challenges of the change to a new technology the management also should think about the status of the machines in the everyday life and how to communicate it.

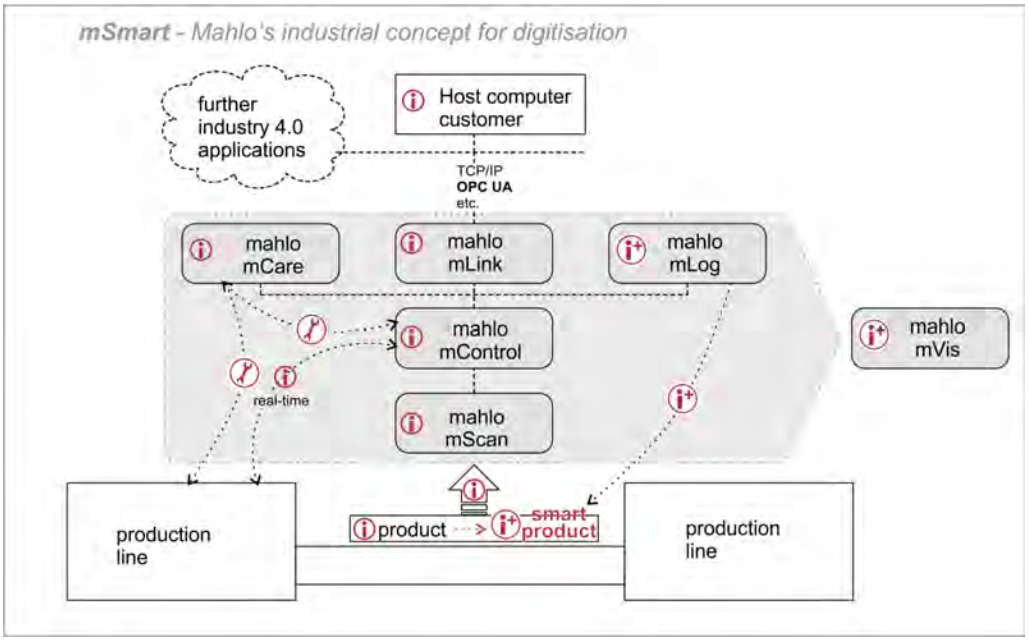

Fig. 2: mSmart

As we consider any entity as a socio-economic scheme, this system change requires a special handling of the human factor. Smarter machines raise a scenario that has been the basis for many science fiction blockbusters. None of them is free of conflicts, as we know. It is up to us to create a vision of our own future. A vision, which is economic, sustainable and defined by a work-life-balance that makes the best use of the potential smart machines are offering to us.