**Ready for Industry 4.0 – sensor-based condition analysis of power units**

**Focus on predictive maintenance: Grotefeld to showcase first digitalised drilling and milling units**

**It is safe to say that Artificial Intelligence (AI) and Industry 4.0 will change the world even more drastically than all of the industrial revolutions in the past – including the Internet with its applications. Therefore, forward-looking companies today are already working on the digitalisation of their operational processes and products. Grotefeld GmbH, which is based in Espelkamp near Lübbecke, has launched a “digitalisation offensive” as a market leader for power unit technology, the results of which will be presented to trade visitors for the first time at Ligna 2019.**

“Industry 4.0” is tagged as the digitalisation of all business processes, particularly with regard to industrial production. Typical characteristics are: complete automation and interconnectedness to the highest possible extent, data communication and analysis, preferably via IoT (Internet of Things) and Cloud as well as the integration thereof in operating systems of various hierarchical levels. In doing so, the course of this new industrial revolution, which is just getting underway, is dependent upon the sector, size and location of the company, type of product or distribution channels.

Just like in other economic sectors, the industrial manufacture of furniture is already very well interconnected in its production processes. However, digital progress is also a highly dynamic process in this case. The power unit pioneering company Grotefeld already started a “digitalisation offensive” some time ago, setting up structures for this purpose and pressing ahead with the first product developments focusing on predictive maintenance.

**Determining when maintenance is to be carried out based on the continuous collection of data**

There is hardly anything worse than having to deal with operational failures and the breakdown of supply chains within production processes which are becoming increasingly complex, as is the case in the kitchen furniture industry, for example, simply because maintenance measures were carried out too late or not at all. The current procedure of carrying out preventive maintenance on machines or power units based on experience or safety-related specifications, of simply exchanging them periodically or exhausting them in terms of quality, is a waste of resources which is continually becoming less acceptable in terms of business management.

Over the past few months, Grotefeld has made significant progress in the case of power units in CNC machines, and will now be showcasing digital drilling gears with preadapted spindles for the first time at Ligna 2019. In view of wear and tear and predictive maintenance, it is now the power unit itself that continuously sends relevant data to an SPC: temperature, revolution speed, oscillation, noise emissions, current consumption and load-bearing capacity or, for instance, the number of hours of operation completed.

**Sensor technology for a large number of performance indicators determining wear and tear**

Digital data is recorded by various sensors in or on the power unit. The recorded signals are sent to the power unit control via a bus system connected by wire, whereby the power unit control provides the company network of the customer with utilisation information on all desired power units in real time via an interface – stored and accessible, mostly in a Cloud.

Thanks to this big data and appropriately developed software, any condition of the power unit can be evaluated accurately, and corresponding counter-measures can be undertaken in the production hall in good time. The favoured Cloud solution enables data to be accessed at any time and from any authorised location.

Conversely, it is possible for Grotefeld to swiftly detect potential weak spots and to further develop future generations of power units accordingly. Or to continue enhancing the algorithms required for interpretation after the collection of data.

**Algorithms for interpreting complex groups of key figures**

At the current time, the digital Grotefeld power units visualise critical conditions via push notifications and accessible charts or communicate current operational conditions. The recipient of these notifications is the machine or plant operator who is able to react based on his experience and knowledge. The mechanical engineering company from Espelkamp is currently developing IT-based valuation methods to accelerate and facilitate data interpretation.

The next objective the company has set itself is to enable the machines and systems to react “internally” and independently via the Internet of Things. In doing so, the reaction times are shortened and the “human factor” with its known drawbacks in the securing of uninterrupted production processes is increasingly ruled out. Although this “factory of the future” is still a vision of the company, Grotefeld is already working on very promising solutions together with its industrial partners – which, by definition, will always have multi-vendor capability.

**Cost benefits and increased efficiency in the production and supply chains**

The aims pursued by Grotefeld in the digitalisation of drilling and milling units may be summarised as follows: an analysis of the recorded power unit data with the highest possible degree of accuracy with precise information on the present situation, a swifter and more accurate localisation of potential and future weak spots, better planning of maintenance with less downtime and reduced maintenance costs, increase in operational reliability, availability, efficiency and productivity as well as a significant reduction of costs. In view of power units for drilling and milling, Grotefeld will thus, for the first time, be presenting know-how and products “Industry 4.0 ready” at Ligna 2019.