MARPOSS *Case Study*

SEVERAL LARGE HORIZONTAL DOOSAN LATHES FOR ROUGH MACHINING AND SEMI-FINISH MACHINING ARE MONITORED BY ARTIS DYNAMIC COLLISION KIT SYSTEMS

PROBLEM

During the machining of raw parts, the machines are heavily stressed and sometimes dynamic collisions accur. High level of vibration arises by facing operations with high performance disc cutter milling tools. The machines are operated in the upper performance range.

The most sensitive machine part is the spindle. The customer has spent a lot of money because of damaged spindles. In addition to the commercial costs, it is most of all the machine downtime that leads to capacity problems. This leads to delivery delays, unplanned maintenance and service costs.

APPLICATION

The end customer operates a range of different machines to pre-process the cast steel products produced. The finished products to be used in Aerospace, Construction & Mining, Oil + Gas, Power Generation Industry.

Besides turning and milling, drilling, boring and deep drilling are also carried out. In general, almost all machines are to be equipped with monitoring systems in the near future.

Tests have indicated that the machines reliably stop when a collision occurs. This results in significant savings for the customer.

SOLUTION

The dynamic collisions can be avoided because there is practically no manual intervention.
However, quasi-static protection is also being considered for some machines in the future.
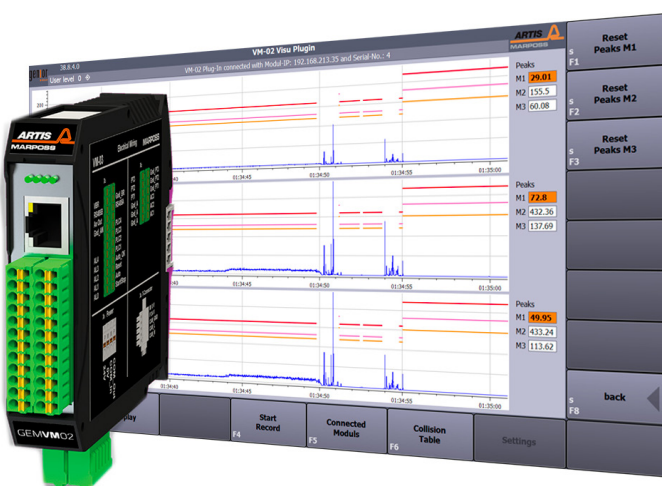
SCOPE OF THE ARTIS GEMVM02 MODULAR SYSTEM

1x 3D-MEMS Acceleration sensor: installed close to the bearing of the spindle, on the back side of gear spindle housing to avoid that coolant and the chips affects the measuring
1x GEMVM02 module: placed in the electrical cabinet
1x GEM VISU: installed on a PC on-site
The Integration has been performed by I/O signals.

All GEM**VM**02 modules are additionally connected to local Ethernet, to enable customer to monitor all monitoring systems from any connected place of the plant.

The sensor measures acceleration in up to 3 axis. In case of an over-limit value, the system set an alarm output signal within 1ms. Dedicated axis of the DOOSAN machine can be stopped rapidly.

REMARK

The GEM**VM**02 module is now replaced by **new** GEM**AMS** module and VA-3D MEMS. GEM**AMS** keeps all the GEM**VM**02 module functionality providing the following additional features:

✔ Frequency analysis via FFT evaluation
✔ Recording of process sequences (coordinates exportable as csv file)
✔ Stop-event data recording (date, time, related values) for analysis (exportable as csv file)
✔ Three temperature monitoring signals
✔ Gravity measurement (by dedicated sensor)
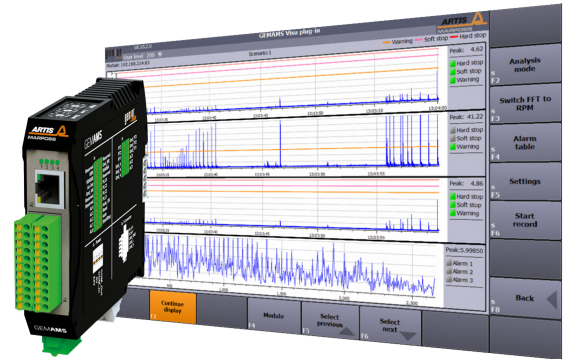
GEM**AMS** shows **8 different scenarios**, five more than the GEM**VM**02, with 3 different limits for each signal per scenario.

BENEFITS

Avoidance or significantly minimizing consequential damages and losses due to possible rapid stop of machine tool axis – caused by dynamic collisions.

Savings are:
✔ Less costs of scrap
✔ Less costs of lost production time (down-time)
✔ Less cost of damaged machine parts
✔ Less cost of tool damages
✔ Less costs of customer claims due to late delivery time

By using GEM**VM**02 the production management can...
• operate their machines 24/7 because of a emergency stop after a collision
• analyze all events recorded in a black box in order to prevent similar situations
• connect the module to the local network for remote control

MARKET

The system can be used for protection in different machines and systems in different industrial markets. Therefore it is suitable for:

• New machines and systems: manufacturers (OEMs)
• Existing machines: retrofits at end-users
• Industry 4.0 customer projects

To find out more about our **new** system GEM**AMS** please visit the website:
https://www.marposs.com/eng/product/dynamic-collision-crash-detection-system