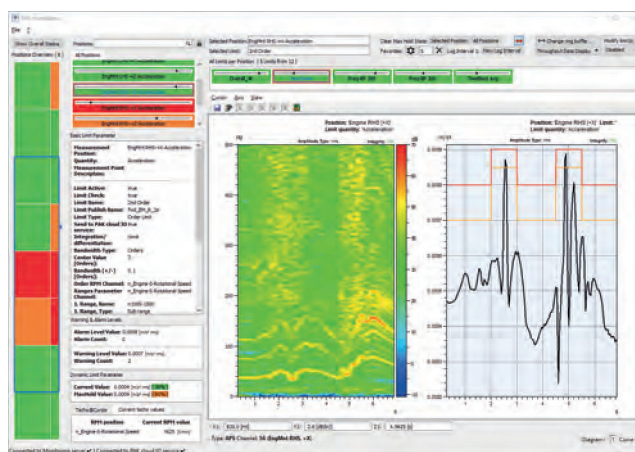# Test bench utilization

Secure and streamlined control systems are the way forward for optimizing test bench productivity

Traditional NVH engine test benches, whether ICE, BEV or PHEV based, are rather expensive in operation and maintenance. Hence, the demand arises to use them to capacity. This can only be achieved by optimized cycle times for their usage and by automatization of the measurement procedures, where technicians are only required to mount the test subject and apply the desired sensors at defined positions.

Therefore, the test bench control system needs to be enabled to drive the engine automatically at different loads with different timing parameters and in various states. To achieve this, the data acquisition system needs to be flexible with the kind of data it acquires, be it digital or analog. It must also be able to communicate reliably with the test bench control system, as well as monitor the entire setup to prevent damages to the test subject or the test bench itself.

To achieve these requirements, Müller-BBM VibroAkustik Systeme has established a streamlined, cloud-based approach with secure communication between data sources and applications. Measurement tasks can be predefined at the test bench and transferred to the PAK device cloud, a data hub that controls the PAK measurement system and the data stream between system components such as an Order-ATFX. This includes

Data duplication, time-consuming search processes and data conversion issues are no longer faced

information on the test procedure, the applied sensors, measurement positions/quantities, and descriptive data. Through this, the PAK MKII data acquisition frontend(s), other required hardware and all required software components, are automatically configured.

For showcasing these features, an exemplary design might be the combined use of PAK recording and PAK monitoring. The PAK recorder just records the desired channels as ASAM ODS ATFX files and can be easily triggered by the test bench.

All predefined data from the Order-ATFX is stored as descriptive data, while PAK monitoring is used to observe maximum limits for noise, vibration and rotation, applying either individual or multiple channels in order to monitor the conditions of the test subject.

Various different analysis methods, such as band pass level and order levels, can

Data can be analyzed in the PAK software to assess if NVH targets have been met

be monitored to describe the current state of the test subject and are directly transmitted to the test bench control system, including the information on whether predefined limits are exceeded or not. Consequently, the test procedure can be adjusted automatically, or the test can be simply stopped.

The recorded data is automatically uploaded into the PAK cloud, Müller-BBM VibroAkustik Systeme's powerful data management ecosystem and stored or automatically processed and analyzed according to the definition in the order. A report can also be created easily, and all data can be viewed according to the dedicated rolls and rights from anywhere in the company network or via the internet. ❮

The relentless advances of Müller-BBM VibroAkustik Systeme's powerful technology adds impact to efficiency

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