

Load-Bearing Transducers Bring Safety to Birmingham Symphony Hall

The imposing Birmingham Symphony Hall has a world-wide reputation for its acoustic performance. Part of the acoustic control is a 35 tonne acoustic hood situated directly above the stage. This hood, which is supported by 28 cable assemblies, can be raised and lowered with servo assistance to vary the acoustics for a particular performance.

The hood is also used to mount additional lighting and audio equipment. Symphony Hall engineers were concerned about the increased loading to the supporting cables.



PCM were invited to design and supply a system which could monitor the loads carried by the acoustic hood, with due attention being given to providing for a large safety factor.

After a detailed feasibility study, PCM proposed that a special strain gauged load link transducer would be designed for in-line load monitoring of each of the 28 supporting cables. These were designed and manufactured by PCM using their experience in stress analysis and the precise application of strain gauges on transducers. The transducers were combined with specially constructed electronic instrumentation which performed both load measurement and overload visual alarm functions.

Each transducer was constructed for precise load measurement whilst being required to fit within the existing cable assembly, with the minimum of disruption. PCM was also responsible for installation of the system which required installing the load transducers in the cable line efficiently and within strict safety guidelines.

With safety in mind, procedures were established for protected of the transducers and the associated electrical cables. This protection extended further with the on-board electronic package for each transducer to ensure that electrical interference did not effect output signals.

Signal conditioning of each transducer provided a 4-10mA two-wire signal output. The resulting 28 individual transducer signals were routed to an instrumentation console also situated on the acoustic hood.

The instrumentation console provided digital readout of each load transducer, summation of all transducers to give a total weight of the hood, and a preset alarm facility.

Each alarm can be preset to a particular load value and if exceeded will operate an LED display and a remote visual indicator. This ensures that when additional lighting or audio equipment is being installed on the hood, if the preset weight limit is exceeded, the LED display will alert engineers.

PCM also devised a method to calibrate each load transducer and the complete system whilst in-situ. This procedure ensured that all measurements and alarms were precisely set to give optimum accuracy and performance.

The entire installation was completed with minimal disruption and now provides a valued safety monitoring system.

The project was delivered precisely on time, within budget and met too 100% the customer's specified requirements.