

# Load Monitoring on Stage – it's already happening in Europe. Now it is also happening in North America.

## **Part 1 – Overview of the trend**

The technical set-up for any kind of live event such as theatre productions, TV shows, concerts, sporting and corporate events is becoming more and more complex. With the use of ever heavier and more dynamic loads, the need to regulate loads and monitoring when the loads are lifted and hung above people, is now of the utmost importance.

In Germany the SQP2 Chain Hoist standard of October 2010 regulates safety restrictions regarding handling of electrical chain hoists and includes the need to monitor loads above people. This standard has been created by the leading associations in the entertainment business in Germany: DTHG (German Association of theatre technicians), VPLT (German Association of professional event technicians and rental companies), EVCC (Association of European Conference & Congress Centers), and the Famab (German Association of booth builders), in cooperation with the BG (equivalent to the American OSHA).

As a result of the above mentioned standard, some of Germany's most important venues, theatres, and production companies use Ron StageMaster wireless load monitoring systems for load monitoring. For example: In Germany: Dart, Malecon, Abt & Hackerschmidt; Olympia Park Munich; Nurnberg Exhibition Center, Dresden State Opera; GOP Entertainment Group. In Switzerland: Habegger; Swiss TV.



Munich Olympia Park

As in many cases in the past, the German standards often have initiated similar thoughts in other European countries as well, so that German standards are often harmonized into European standards. This trend is happening also with the regulation of load monitoring above people, as in the European CWA 15902, which is a voluntary standard, and is one step down from an EN standard.

As the entertainment market is an international market, with world tours, international production companies, and international projects, history teaches us that trends that start in Europe eventually migrate to North America. Load monitoring above people is expected to become a common practice in North America as well in the near future.

Currently some of the most important venues and rigging companies in the US such as Kish Rigging, The Orange County Convention Center, The Boston Symphony Orchestra Center, The Seattle Opera, Hall Associates, and world musical tours such as for the band AC/DC, are using Ron StageMaster systems for load monitoring. It seems that these are just the first drops of rain, and the shower is still ahead of us.

## Part 2 – The added value of using load cells and some testimonials

- **Verification of estimated and actual loads and load distribution prior to the show:** Continuous monitoring of the highest value that was recorded per each load cell and per each group of load cells during trial setups and rehearsals, enables real-time detection of a possible failure in either planning or operation, *"We have been using the Ron Stage Master 6000 (RSM) wireless load monitoring system here at Esplanade – Theatres on the Bay since April 2008. Our RSM 6000 has been used in a wide range of applications from monitoring loads in our Roof Truss System, checking the tensions in guy lines, establishing and monitoring loads in human flying systems, determining how heavy "that" set piece is before it is hung and even checking the weights of flight cases before shipping. I have also used the system on several occasions to assist in the designing and testing of complex load sharing systems. The accuracy of the RSM allows you to test on a smaller scale, to be certain of the loads, forces and methods, before moving up to the real thing". Peter Bretherton - Technical Manager Staging - The Esplanade Co Ltd – Singapore*



- **Real time load distribution monitoring during the whole event (setup, show, teardown):** *"It is obvious that when it comes to a large grid with dynamic loads there is no way that you can just level it by using tape measures. The weight distribution would be different every day. Rammstein World Tour" - Martin Gehring, - One of the owners of Dart GmbH, a rigging company based in Germany, founded in 1993. The system convinced us because of its easy installation which is as we all know very essential when you go out on tour.*
- **Reduction in insurance premiums:** Using the system increases safety and reduces the chance of accidents. Therefore, it may support the request for a lower insurance premium. The user's investment in the system enables verification of a lower risk factor, which both the user and the insurance company should acknowledge. The system will allow greater control over loads and thus a much lower risk of accidents.
- **Approval for smaller and older venues. The elimination of the need for additional equipment as a safety redundancy:** *"To be able to control the weight every day helped us also to get approval from house engineers at smaller venues where we've been very close to the overall load capacity of the roof". Martin Gehring – Dart – Germany*

- **Arenas and multipurpose venues:** More and more arenas, convention centres and multipurpose venues require users of their premises during tradeshows, concerts and other events to use load cells to make sure that loads in roof structures are not higher than allowed. It seems that this is a win-win situation: For the venue users it increases the event's safety with a negligible addition of equipment; it may even justify a request for discount in their event's insurance premium. For the venue owner it is an important tool to guarantee a safe event and the preservation of their venue and help with establishing risk management and insurance criteria. In such circumstances, the cost of the load monitoring system could pay for itself after a relatively short time thanks to the usage fees for the load cells.
- **Tension measurement:** Allocating load cells to measure tension on running wire ropes, stays and control lines provides a comprehensive real-time load map. In outdoor applications it enables the user to analyze the influence of high winds by monitoring tension elements in a structure. *"I first purchased the Ron StageMaster wireless load cells for use with my (people carrying) Acrospan flying system for the Calgary Stampede Grandstand Show (outdoors). By placing a Ron StageMaster load cell on each of the lift lines, I am able to monitor the tension in each line. This allows me to balance the loads on each line at set points in the cueing process and set an alarm on each line that will sound if a line passes its overload point. The alert is activated several seconds before the issue is visible to the naked eye, giving me the necessary time to react to the situation. During the 10th performance in 2009, we experienced a windy rainstorm and a tarp blew into the drum and cable of one of the winches. As the winch began to bog down, the Ron StageMaster system sounded an overload alarm. Watching the readings on the Ron StageMaster program and using manual controls on the remaining winches allowed me to safely lower the piece to allow the artists to safely exit."* Tracy Nunnally-. President – Hall Associates Flying Effects – USA
- **Structural strength test by measuring load deflection per extracted load.** *"In the summer of 2009, Shimizu Octo had the large task of building a new roof system for the ap bank fes '10, a system in which the RON StageMaster was a key factor in creating. The new roof system was a lifting system made up of a tower that combined an aluminum truss American-made structure with layher steel German-made. The rain sheets were developed by Shimizu Octo. Before actually starting the construction, the calculations for the structural strength of the roof and lifting system, as well as other important elements needed to be verified. During the inspection process, the self-weight of the roof truss, a survey of the load deflection, and various other data was verified. After finishing the inspection process, we were able to safely provide our client with the roof truss".* Hiroki Matsunobu - Manager of the Engineering Department, Technological Management Division - Shimizu Octo.- Japan



- **Monitoring loads in performer flying systems:** *"In May 2010, I used the load cells for a large cultural event in Barcelona, Spain, to help determine the load distribution for flying a human castle. For this project, I was able to use the Ron StageMaster load cells to monitor the weight on each of the 4 lines as I added artists to the castle. This allowed me to ensure that the frame would fly level and true, and all support lines would equally share the load. Again, the load cells worked beautifully, and it was so nice to be able to fly the frame through 3 dimensions and receive a constant feed of data from the load cells". Tracy Nunnally-. President – Hall Associates Flying Effects – USA*

