

Ron StageMaster Load Monitoring System For Convention Centers

November 2022

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www.ronloadcells.com



Eilon Engineering
Weighing Systems Ltd.



This presentation includes:

- 1. Safety - The Challenge of Complex Rigging**
- 2. Safety – Examples of Rigging Collapse**
- 3. Safety – New European Standard Requires Load Monitoring on Stage**
- 4. Other Advantages from Load Monitoring**
- 5. Additional Revenue Calculation**
- 6. Examples of Projects**
- 7. Safety and Other Advantages of Our Systems**
- 8. A Win-Win Situation for all Parties**



Safety - The Challenge of Complex Rigging:

Are you concerned about overloads on suspended equipment in your venue?

Today's exhibitions and live concerts are experiencing an ever increasing level of complexity. Riggers are required to fly heavier and more numerous pieces of equipment commonly over the heads of exhibitors, visitors, spectators and performers.

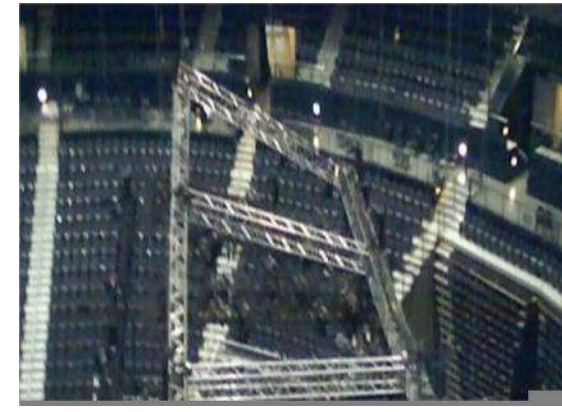
Due to a phenomena in physics called indeterminate structures, the load distribution of a suspended structure with more than 2 hanging points is effectively unknown and incalculable. Consequently, there is potential for dangerous overloads even if each suspended device even when self weight is known and the structure that appears visually balanced. This is due to some points carrying greater loads than others.

Due to the incalculable nature of the load distribution on an indeterminate structure, a load monitoring device must be used to measure actual loads, detect overloads and allow the rigger to take quick preventive actions to rebalance the loads and ensure even distribution



Safety – Examples of Rigging Collapse

<https://www.eilon-engineering.com/about-us/preventable-accidents/>



Safety - New European Standard Requires Load Monitoring on Stage

EN 17206 Entertainment technology – Machinery for stages and other production areas – Safety requirements and inspections

Requirements:

- Protection Against Overload
- Protection Against Underload
- Protection Against Load Variation
- Slack Chain Detection

In the spring of 2020, the long-awaited European standard for safety requirements of stage machinery based on CWA 15902-1 was approved by Technical Committee CEN/TC 433. Within a few months EN 17206:2020 was adopted by several European countries that voted for the approval and implementation of this new standard that will bring a common level of safety for stage machinery and control systems across Europe: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Luxembourg, Netherlands, Poland, Serbia, Slovenia, Spain, Sweden and the United Kingdom.

Other countries are expected to adopt this standard in the near future.

Other Advantages of Load Monitoring

- Safely host **larger and heavier shows**
- Safely make use of **older buildings with load limitations**
- **Shorten the time** between one show to the other (load-in/load-out)
- **Increase revenue** through rental fees for load monitored hanging points
- Eliminate the need for **excess lifting equipment** for risk mitigation
- **Reduce insurance premiums** through quantifiable risk reduction
- Protect **exhibitors, performers and audiences**
- Protect the **rigging infrastructure**
- Protect **expensive equipment**
- Protect from accidents and potential **litigation, damages, risk to reputation and venue shut down**
- Keep your venue on the cutting edge of **technological advancement**



Other Advantages of Load Monitoring

Accurate load measurement instead of estimates:

“Apart from greater safety, this also provides certainty as to the forces that can be applied to the roof constructions and to the possibly existing reserves. Thus, new fair stands can be achieved, the likes of which have never been known before”

- Udo Oerther – Head of the SAG at Nürnberg Messe Exhibition Center



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Additional Revenue Calculation

Example of revenue from a load monitored venue:

ROI:

Cost: approximately \$1,600 per load cell (need to add receivers, carrying cases etc but the addition is negligible).

Revenue: \$200 per load cell per show = Fast ROI after 8 shows

Limited time offer:

90 days credit terms (and possibly more) for the first 50 systems in an order of at least 100 load cells.

Usage fee: \$200 per show per load cell

5000 hanging points for large shows = \$1,000,000 per large show



Examples of Projects

Case study # 1: Nuremberg Messe 2015 - Ron StageMaster load monitoring system with **400 load cells**

"Prior to the installation of the Ron StageMaster system, since 2011, SAG has been verifying the load monitoring systems of various manufacturers, has determined further developments, and finally has tested and continually adjusted for an entire year a system that should fit exactly the requirement of the Nuremberg Fair Trade. The load measuring system made by Eilon Engineering, came closest to meeting the requirement profile." Udo Oerther – Head of the SAG at NürnbergMesse Exhibition Center

Case study # 2: Malaysia International Trade and Exhibition Centre 2020

- A Ron StageMaster load monitoring system with **400 load cells** was purchased.

Case study # 3: Hong Kong Leisure and Cultural Services Department 2017

- Ron StageMaster load monitoring systems for **all theaters in Hong Kong**



Examples of Projects

Other venues we work with:

Orange County Convention Center – USA

Las Vegas Convention Center – USA

Malaysia International Trade and Exhibition Centre - Malaysia

Messe Gratz - Austria

Munich Olympia Park - Germany

Messe Dusseldorf - Germany

Finnish National Opera - Finland

Royal Shakespeare - UK

Seattle Opera - USA

Nuremberg Messe - Germany

Chicago Shakespeare Theater -USA

Casa da Musica - Portugal

Esplanade Theater on the Bay - Singapore

Hong Kong Cultural Center - Hong Kong

Sächsische Staatsoper Dresden - Germany

Boston Symphony Orchestra - USA

Theaterhaus Stuttgart – Germany

Here is a link to [more projects](#)

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Ron Stagemaster Customers in the US

3-B Productions

Alford Media Services

Arts & Venues Denver

ARTS BROOKFIELD

AT&T Performance Arts Center

AZZ Galvanizing Services

BF Productions

Blue man Group Productions

BNW Rigging

Boston Symphony Orchestra

Brigham Young University

Buddy Holly Hall

Buena Vista Theatrical

Charleston Gaillard Mng. Corp.

Chicago Flyhouse

Chicago Shakespeare Theater

Cirque Du Soleil -

Cory's Audio Visual

Disney Dream Entertainment

DMM SYSTEMS

Dynamic Event Group

Dynamic Productions

Earl Girls Inc.

Eldorado Resorts

Entertainment Project Services

Ford Audio Video

Govision

Hall Associates Flying Effects

Hands On Rigging

HKPA

Katy Independent School

KB Entertainment Inc.

KDH PRECISION

KISH RIGGING Inc.

Las Vegas Convention And Visitors Authority

Liberty University

Liberty University

Life Church

Lincoln Center

Lincoln Center For The Performing Arts

LMG

Lockheed Martin

LVH Entertainment Systems

Man Up Rigging

Mayo Performing Arts Center

Minneapolis Armory

Minuteman HS

Mountain productions

MSU DENVER

Murphy Arts District

NASA

NBC UNIVERSAL

New Victory Production

North Point Ministries

Olympus Painting Contractors

Orange County Convention Center

Pacific West Sound

Partech Lighting Systems

Passion City Church

PRG Lighting Las Vegas

PRG SCENIC TECHNOLOGIES

Production Rigging

Production Services Of Maine

PSAV

SB Productions

Sea Koehler

Seattle Opera - Upgrade

StagePro Inc.

Tait Towers, Inc.

Timms Centre For The Arts

Toucan Productions

Tuacahn

UIW

United Staging

Universal City Development - By

R&M

University of Texas at Austin PLAI

Vegas Rigg LLC

Venetian Resort Hotel

VIRGIN ORBIT

WATERFRONT CONCERTS

YALE SCHOOL OF DRAMA

ZACHRY INDUSTRIAL

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Important Safety Features for Load Monitoring Systems

Unique feature	Feature significance
Accuracy: 0.1% of full range	Crucial for early detection of overloads the moment they start to develop. This enables the rigger to immediately balance the loads before a dangerous situation occurs. Many of the load cells in the market have 1%-2% accuracy i.e.10-20 times less accurate which results in greater overload detection delay.
Fatigue rated load cells* - Per ASME BTH-1 and IEC 61508	Allows for a practically unlimited number of load cycles, provided the load cells are not overloaded. This is very important to ensure safety in convention centers where many load cycles occur.
5000h of battery life on common disposable batteries (No sleep mode)	Important for ensuring continuous, uninterrupted load monitoring in the convention center. Battery change required only after 6 months of continuous use. Any type of sleep mode is not allowed for safety systems. Continuous load monitoring is crucial from the beginning of the installation, through the entire show and until the end of dismantlement. Even when power is shut during live events, load monitoring should continue since load distribution might shift even when power is off.

Important Safety Features for Load Monitoring Systems

Unique feature	Feature significance
The load cells measurements are presented as a Real time load map which reflects the load cells accurate position in the venue	For quick detection of an overload's location, the moment it begins to develop. Quick identification of the motors requiring rebalancing in order to eliminate the developing overload.
BT connectivity to mobile devices	Smartphone/Tablet load monitoring allows for easy walkarounds and installations
Up to 200 load cells per monitoring station	Makes it possible to monitor a large number of load cells from a single workstation.
Slave - Master option	Monitor multiple areas from a centralized location
E-stop option	Automatically trigger emergency stop and an alarm on overload detection
SMS Option	Notify facility managers of detected overloads



Additional Safety and Performance Competitive Advantages

Safety:

- Market leading **5 Year Warranty**: High quality and reliability.
- **Meets industry standards**: All Eilon Engineering systems meet the requirements of international standards
- **Reliable transmission technology**: Based on decades of experience with the harsh transmission environments of NASA launch sites.
- **Aerospace steel**: Manufactured using only high grade steel for load cell bodies.
- **Shackle holes offset 90 degrees**: Reduces bending for increased safety and accuracy.
- **Proven wireless technology since 1976** with repeat customers such as NASA, Boeing, Cirque du Soleil, Disney, NBC Universal



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Additional Safety and Performance Competitive Advantages

Unmatched performance:

- Transmission range: **Up to 3 km / 2 miles** (upon request). Standard: 150 m/yds.
- **Lightweight and portable. Minimal headroom loss:** Short length ensures minimal headroom loss. No need for additional lifting accessories
- **Heavy duty designs with shock absorbing mechanisms.**
- **Advanced software:** Enables real-time load map for quick detection of overload, as well as reports of months of measurements for study &
- Large capacities: From **500 kg. and up to 300 tons!** - 5:1 and 10:1 safety factors.
- Environmental: **IP 67/NEMA 4-Weatherproof** standard for the wireless load cells, optional for all other models.



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5
Year
warranty

45
Years
expertise

A Win-Win Situation for all Parties

For the exhibition center:

Increased safety: Significantly reduces the chance for an accident

Addition of significant revenue: Approximately US\$1,000,000 per year

Increased efficiency: Shortens the time between one show to the other

Cost reduction: Reduced insurance premium

Safeguard Human lives, expensive equipment, venue infrastructure

Protection from: Litigation, damages, reputation risk, venue shut down

Business opportunities: Safely host larger and heavier shows

Business opportunities: Safely use old buildings for shows

Business opportunities: Host complex concerts in sports/convention center venues

Image and reputation: Technologically advanced and a leading venue



A Win-Win Situation for all Parties

For the exhibitors:

Increased safety: Significantly reduces the chance for an accident

Efficiency: Saves excess lifting equipment while trying to mitigate the risk

Efficiency: Shortens installation time

Reduces insurance premium: thanks to reduction in risk

Protection of: Human lives, expensive equipment

Protection from: Litigation, damages, reputation risk



A Win-Win Situation for all Parties

Testimonial of Mr. Udo Oerther, Nuremberg Messe / SAG (In 2015 bought 400 of our load cells):

"Accurate load monitoring instead of estimations: Apart from greater safety, this also provides certainty as to the forces that can be applied to the roof constructions and to the possibly existing reserves. Thus, new fair stands can be achieved, the likes of which have never been known before."

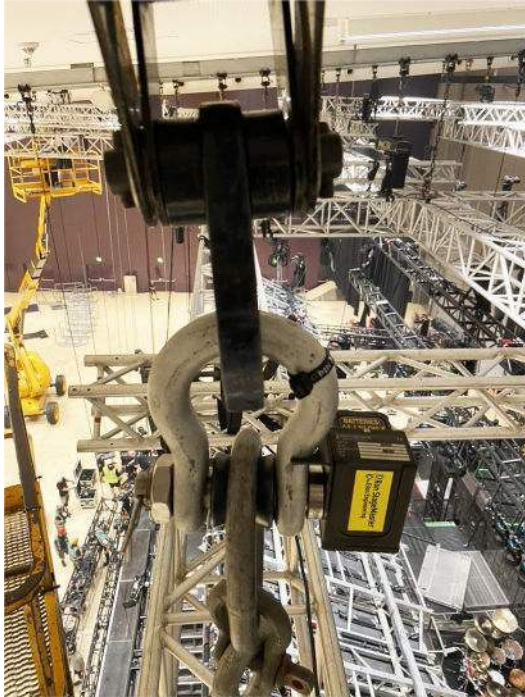
"With the new load monitoring system, we developed further, and we improved our service on the fair premises. Numerous customers are glad to be offered the possibility of load monitoring and thus to be able to coordinate work runs in a better, simpler and first and foremost safer manner."

"We are using the system not only for the daily routine at trade shows but also for touring and theatre work have been simplified in many respects."

"With the new load monitoring system, we have taken an important step into the future, so as to simplify service work and to advance even further the site of the Nuremberg Fair Trade."



Installation photos - Messe Graz



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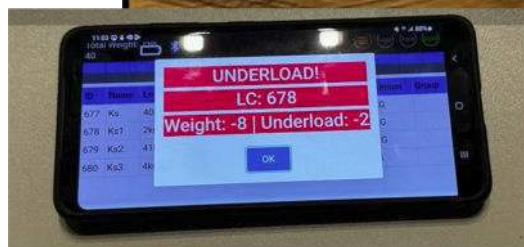
5
Year
warranty

45
Years
expertise

Installation photos - Prague Convention Center

“TECHNOLOGICAL INNOVATION is one of our values. Therefore, we are constantly improving the equipment of our halls. In our 2nd largest meeting room called Forum Hall, we recently installed a monitoring system for the weight of the loads suspended on the ramps above the stage.

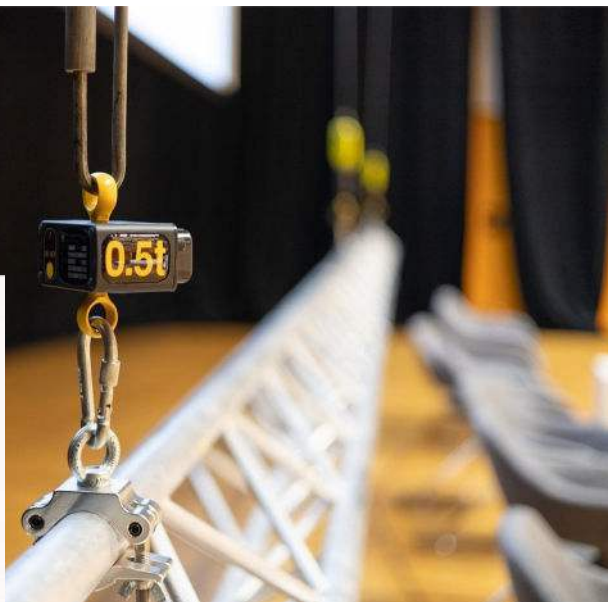
This device remotely monitors information about the load on the ceiling structure and sends them to our technical staff.”



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Installation photos - Prague Convention Center



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Convention centers video

<https://www.youtube.com/watch?v=hQOHYAcgR0I>

