# Intro to Rigging at [PROPERTY]

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TB
12/19/18
ER 6

# Introductions

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# INTRODUCTIONS

- Patrick Wallace (pwallace@psav.com)
  - RRM: Mid-Atlantic Region
    - MD, DC, VA, WV, KY, Pittsburgh, PA and Niagara, NY Region
- Erik Lundquist (elundquist@psav.com)
  - Rigging Coordinator
    - DC, Maryland, Kentucky
    - **Mid-Atlantic RC Staff** (Oversee staff of approx. 20 ft/pt)
      - Randy Whitcomb: Marquis, Trump, Grand Hyatt
      - Eric Reuter: DC, Virginia, West Virginia
      - Chad Houseknecht: Gaylord National

# INTRODUCTIONS

- Name
- What is the highest level of rigging you have done
- What do you want to get out of this class
  - "I have to be here" is fine.

# WHAT ARE WE DOING TODAY

- Background to PSAV Rigging process and procedure
- Intro to rigging equipment and materials
- Intro to PSAV Rigging SOP's and back end support
- Where to go for more
- Lunch
- Staff Meeting
- Hands on Segment

# INTRO TO RIGGING OVERVIEW

- Introduction to Rigging Basics
  - What is Rigging?
  - What are Riggers?
  - Rigging Team Structure
  - Benefits of PSAV Rigging
  - Rigging Advance Process
  - Rigging Sales SOP
  - Rigging SOP: Property Level Operations
  - Aerial Acts
  - Rigging Hardware
  - Ground Support Truss SOP
  - Airwall Hanging SOP
  - Training

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# What is Rigging?

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# What is Rigging?

For PSAV's purpose, rigging is defined as all work that requires any sort of equipment to be fixed or suspended from the building fabric or structure of the venue for exhibition, conference, sport or special event purposes by means of temporary wires, cables, cords, slings, chains or lifting appliances. Rigging is further defined as the hanging or fastening of any items at a height of six feet or above.

As you can guess from this definition, rigging applies to a large variety of situations and applications, some that you may not have even considered rigging in the past. We all need to be fully mindful of the dangers that are involved with suspending anything overhead. When failure occurs in these situations, the results can be catastrophic for all those involved. Because of these dangers, we must have only properly trained personnel conducting and overseeing all facets of rigging to assure that everything is done safely and with reliable, properly inspected and certified hardware. If you ever have doubts regarding anything related to rigging, you are responsible for getting these doubts cleared up to your satisfaction with a member of the PSAV Rigging Services Division. Seek out a Rigging Supervisor or Regional Manager so they can review and perhaps physically look at the rig to determine what needs to be done.

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# RIGGING DEFINED

- Above 6 Feet
- Attached to Structure of Building

- Motorized?

# Gravity:
# It's always working

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# Riggers have a 0% Failure Option.

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# RIGGING FAILURES

Homebuilders Show - Las Vegas Convention Center

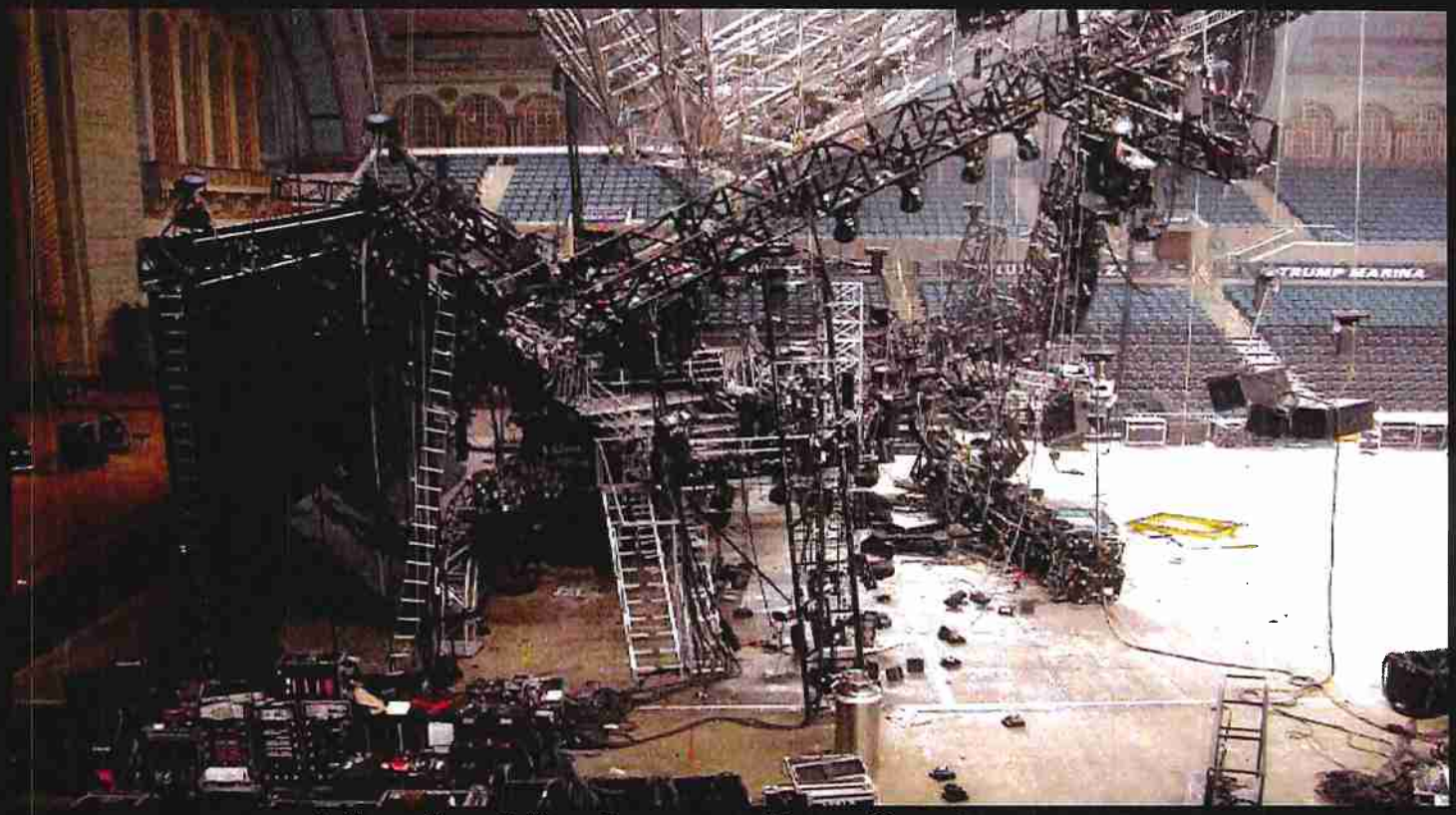
# RIGGING FAILURES

Riu Center in April 2004

# RIGGING FAILURES

LED Wall Failure

# RIGGING FAILURES




Atlantic City Convention Center

# What are Riggers?

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# WHAT ARE RIGGERS?

- Riggers are specialists in safely lifting and supporting loads.
- Riggers make attachments of loads to structures such as buildings, tents, scaffolds, etc.
- Riggers are experts in the use of equipment designed to support loads.
- Riggers are responsible for the oversight and safety of all hung objects.

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# Rigging Team Structure

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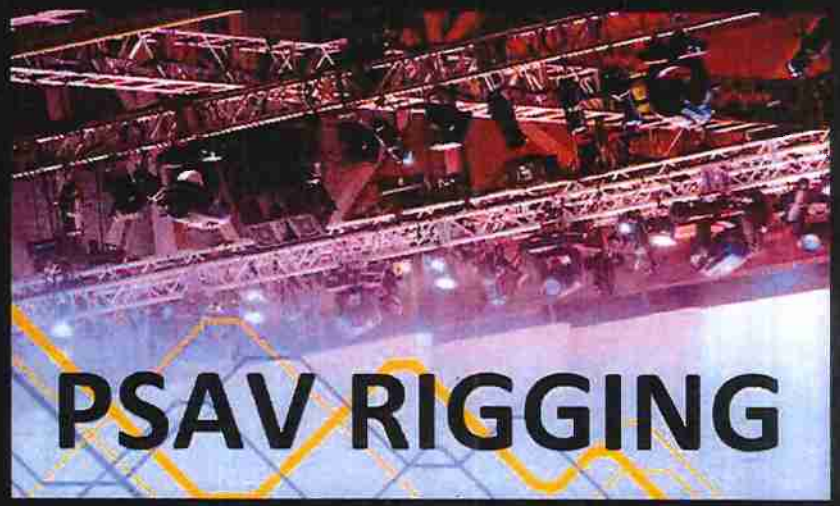
# RIGGING TEAM STRUCTURE

- VP of Rigging Services – Todd Spencer
- National Directors
  - Eric Warden – Director of Production Rigging
  - Demian Purdy – Director of Installations
  - Josh Desyn-Lodise – Director of Sales
- Directors of Operations
  - Carlos Ortega – West
  - David Darland – East
- Training Manager– Michael Schaper
- Regional Rigging Managers - 11
- Rigging Coordinators ~ 65
- Lead Riggers
- Riggers

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# RIGGING TEAM STRUCTURE

- Eric Warden – Dir. Of Production Rigging
  - Motor Maintenance – Mike Weston
    - David Creel, Adam Wilds, Jon Rockwell
    - Service centers set up in major cities and in pop up locations across the country
    - All hoists require annual inspections
    - 6000 Hoists annually
    - Industry leader in hoist inspections
  - Point Inspections – Jordan Alcon
    - Garrett Hilliar
    - Point inspections set up on an annual basis for all properties with rigging points left in the ceiling, whether temporary or permanent

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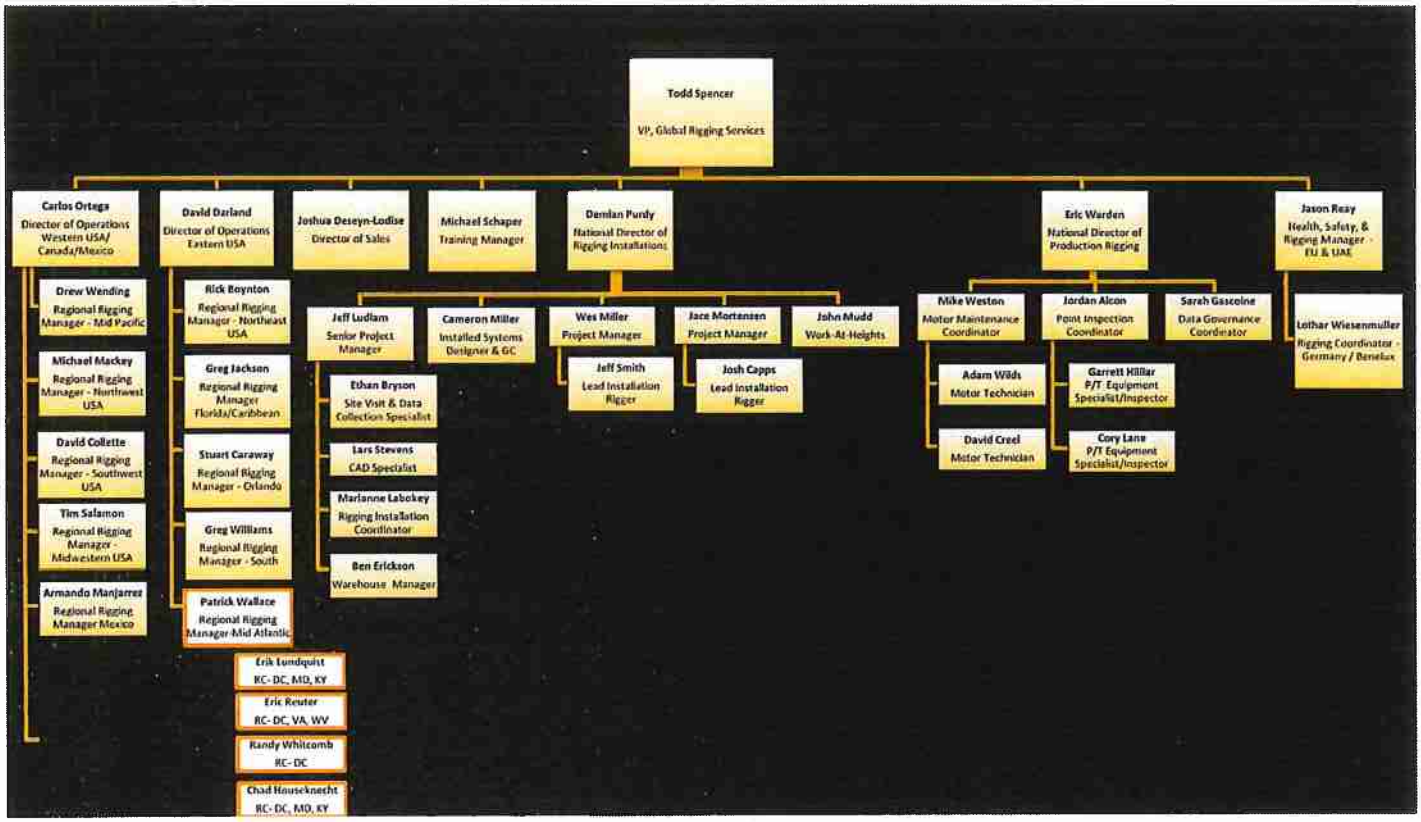
Todd Spencer
VP, Global Rigging Services
Carlos Ortega
Director of Operations Western USA/ Canada/Mexico
Drew Wending
Regional Rigging Manager - Mid Pacific
Michael Mackey
Regional Rigging Manager - Northwest USA
David Collette
Regional Rigging Manager - Southwest USA
Tim Salamon
Regional Rigging Manager - Midwestern USA
Armando Manjarrez
Regional Rigging Manager Mexico
David Darland
Director of Operations Eastern USA
Rick Boynton
Regional Rigging Manager - Northeast USA
Greg Jackson
Regional Rigging Manager Florida/Caribbean
Stuart Caraway
Regional Rigging Manager - Orlando
Greg Williams
Regional Rigging Manager - South
Patrick Wallace
Regional Rigging Manager-Mid Atlantic
Erik Lundquist
RC- DC, MD, KY
Eric Reuter
RC- DC, VA, WV
Randy Whitcomb
RC- DC
Chad Houseknecht
RC- DC, MD, KY
Joshua Deseyn-Lodise
Director of Sales
Michael Schaper
Training Manager
Damian Purdy
National Director of Rigging Installations
Jeff Ludlam
Senior Project Manager
Ethan Bryson
Site Visit & Data Collection Specialist
Lars Stevens
CAD Specialist
Marianne Labokey
Rigging Installation Coordinator
Ben Erickson
Warehouse Manager
Cameron Miller
Installed Systems Designer & GC
Wes Miller
Project Manager
Jeff Smith
Lead Installation Rigger
Jace Mortensen
Project Manager
Josh Capps
Lead Installation Rigger
John Mudd
Work-At-Heights
Eric Warden
National Director of Production Rigging
Mike Weston
Motor Maintenance Coordinator
Adam Wilds
Motor Technician
David Creel
Motor Technician
Jordan Alcon
Point Inspection Coordinator
Garrett Hillar
P/T Equipment Specialist/Inspector
Cory Lane
P/T Equipment Specialist/Inspector
Sarah Gascoine
Data Governance Coordinator
Jason Reay
Health, Safety, & Rigging Manager - EU & UAE
Lothar Wiesenmuller
Rigging Coordinator - Germany / Benelux

# Benefits of PSAV Rigging

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# SAFETY BENEFITS

- Exclusivity protects staff, structure, and guests
- Provides long-term safety of rigging equipment
- Compliant with OSHA / PLASA / ANSI / ASME regulations
- Professional handling, inspection, recordkeeping, and recertification of equipment
- All truss and other equipment manufactured and structurally engineered for use in the entertainment industry

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Employer of ETCP Certified Technicians

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the worldwide voice of entertainment technologies

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# BALLROOM RECAPTURE

- Saving time on production load in / out can increase the number of available ballroom rental days for the hotel
  - As many as 27 additional rental days per year
  - Pre-rigged truss before load in will cut client required load in time opening additional dates
  - Preset trussing for multiple clients to use means no downtime in between events

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# VALUE TO CLIENTS

- It's easier…
  - Saves clients the time and cost of renting and transporting truss to the hotel. PSAV already has the truss on-site.
- It's faster…
  - Enables clients to come in to pre-rigged space and begin adding their production elements right from the start.
- It's safer…
  - Clients receive inspected and certified truss for their event and PSAV handles all of the documentation behind that to protect them from liability.

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# VALUE TO PRODUCTION TEAMS

- Pre-hung motors and truss save production teams time for load in
- PSAV is able to immediately supply additional truss if the need should arise vs the production company having to search for their own resources and delay the load-in
- Production teams are able to walk away after their elements are removed instead of waiting for truss to be disassembled and loaded into trucks
- PSAV becomes full service "truss up" provider

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# INCREASED REVENUE

- Ability to capture portions of shows where PSAV wasn't able to win entire contract
- Hotel benefits from additional commission

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# Rigging Advance Process

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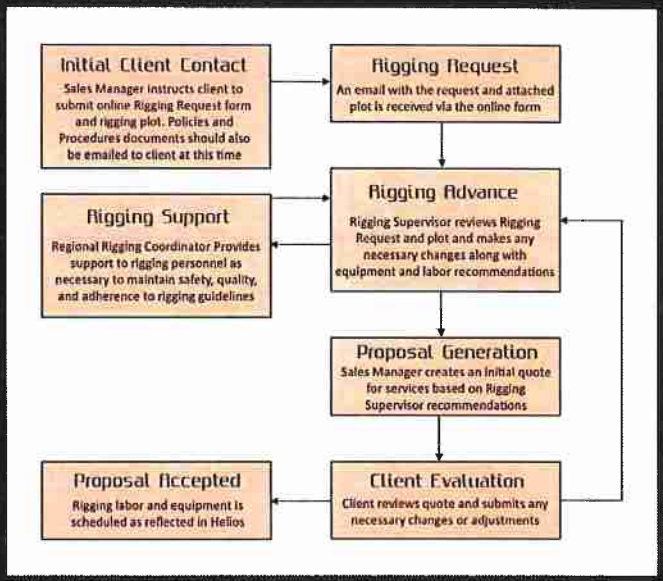
# RIGGING ADVANCE PROCESS

- Rigging Advance flow chart
  - Initial Client Contact
  - Rigging Request
  - Rigging Advance
  - Rigging Support
  - Proposal Generation
  - Client Evaluation
  - Proposal Accepted

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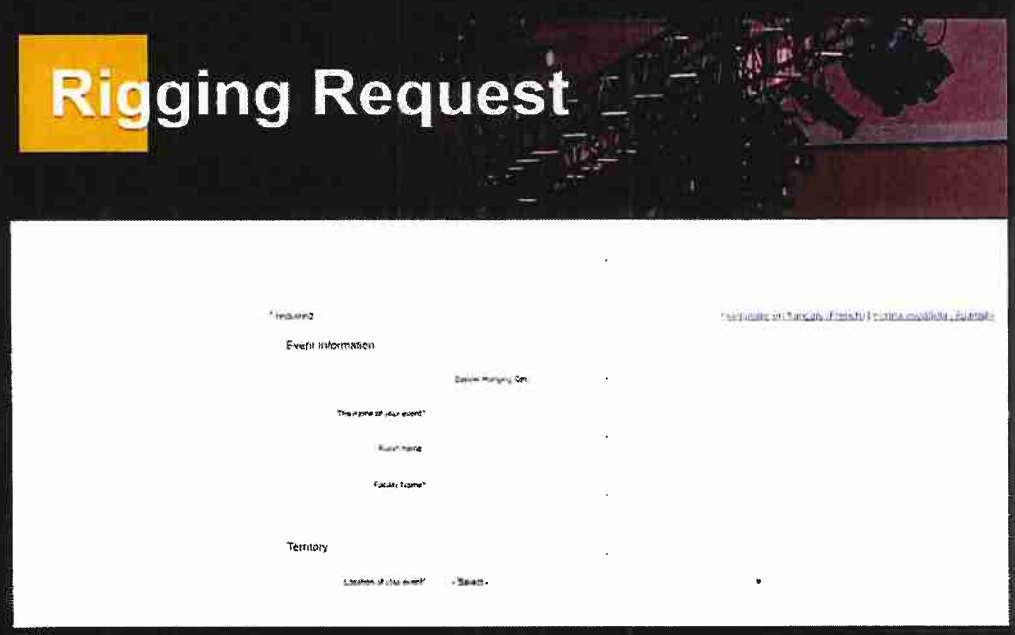
# RIGGING ADVANCE PROCESS

- Rigging Advance Website
  - http://www.psav.com/RiggingForm
  - All clients with overhead rigging must submit.
    - This includes PSAV managed shows
  - Provides basic information to the correct rigging personnel as well as the sales team to create a quote.
    - Show name
    - Dates
    - Client Information
    - Equipment Needed (Maybe)

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# RIGGING ADVANCE PROCESS

- Rigging Team Site - Sharepoint
  - Intranet calendar used by the Rigging Team to track and manage all rigging requests nationally.
  - Rigging Coordinator enters all Rigging Advance requests into this page prior to sending out the info to the properties.
  - Viewable by all rigging team members for any region in the country.to provide redundancy.

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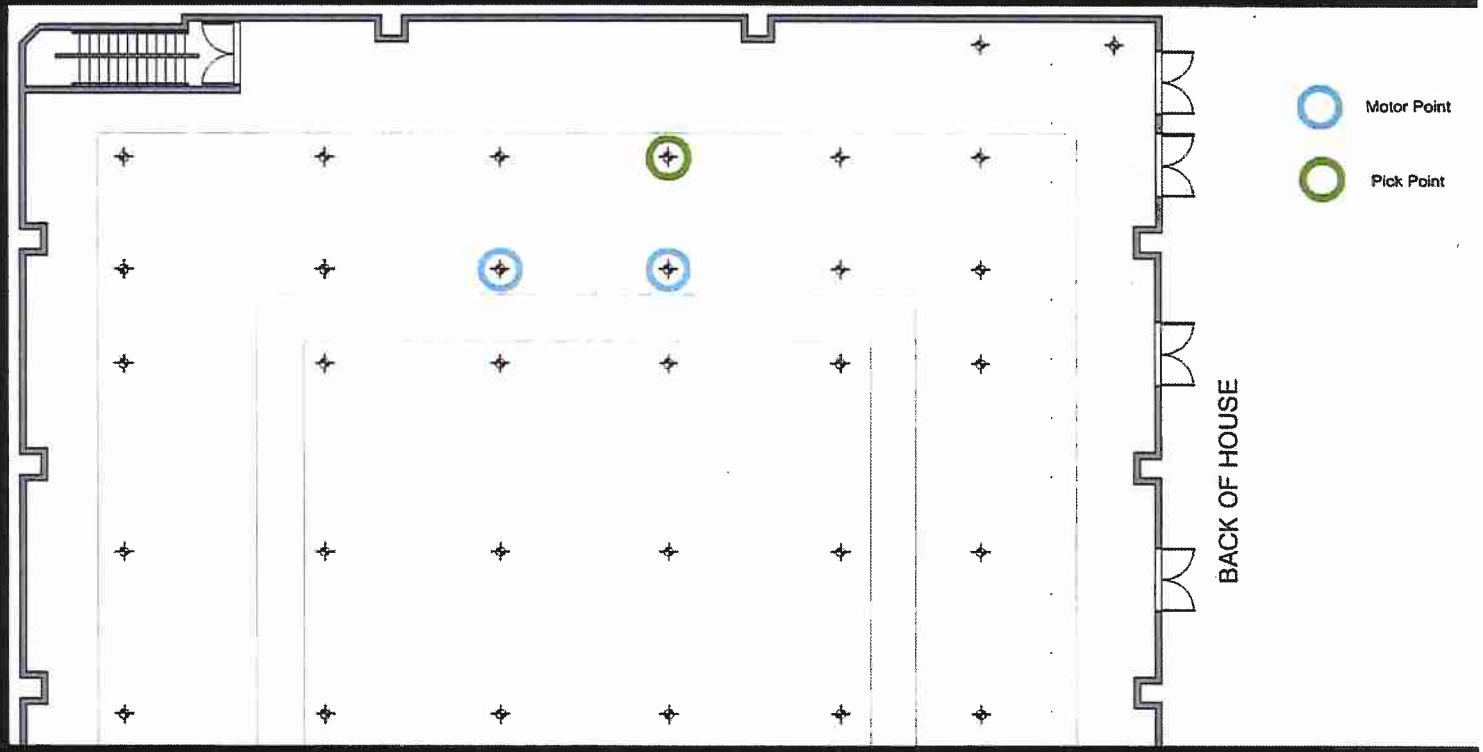
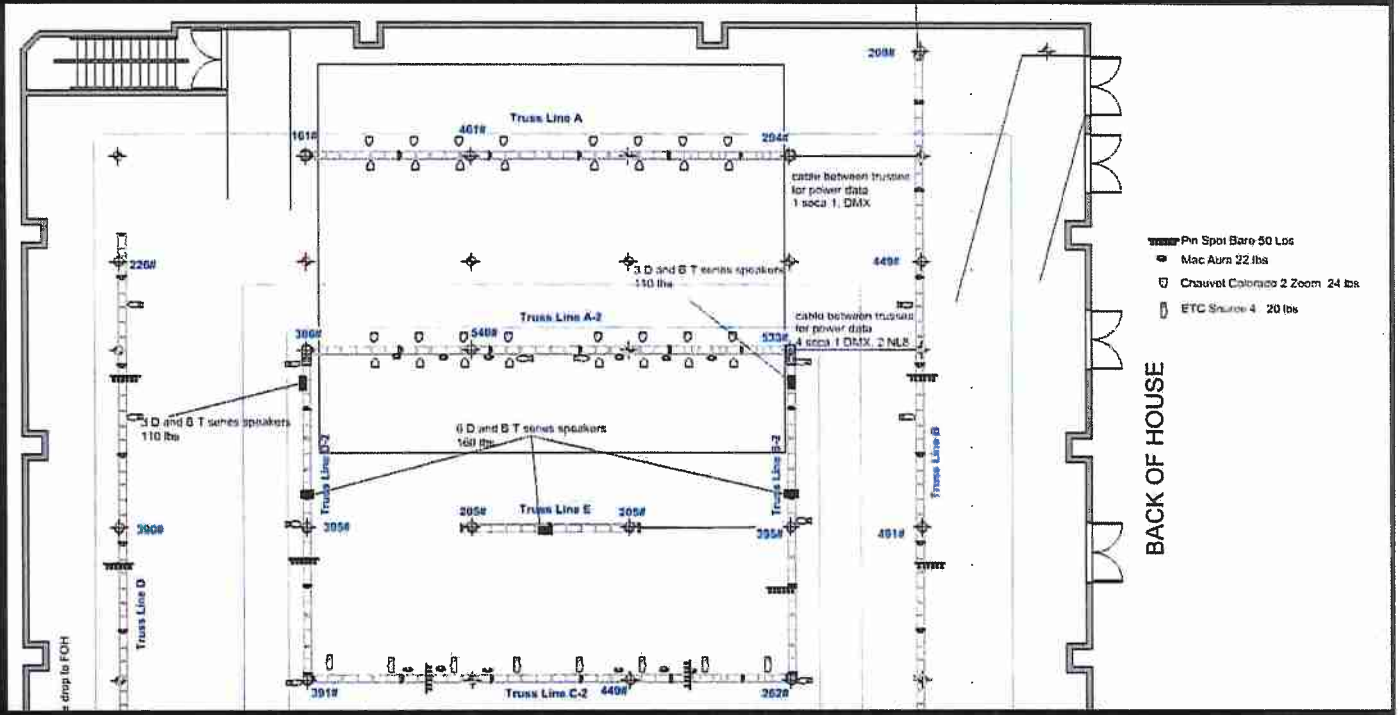
# RIGGING ADVANCE POINTERS

## BAD PLOT



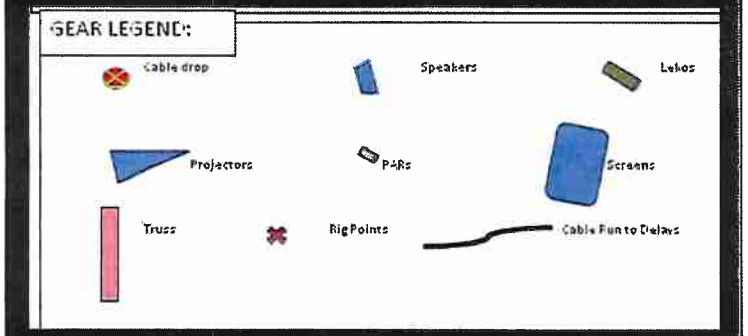
# RIGGING ADVANCE POINTERS

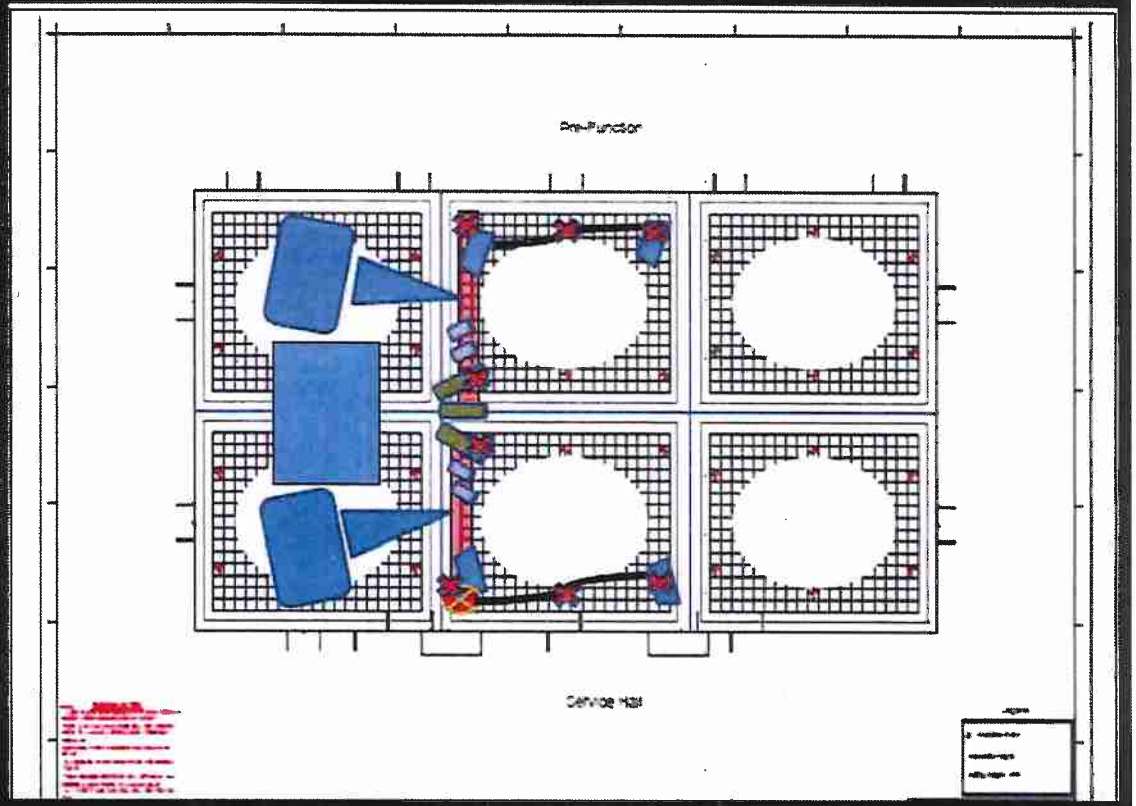
## GOOD PLOT



# RIGGING ADVANCE POINTERS

BETTER THEN NOTHING AT ALL



# RIGGING ADVANCE POINTERS

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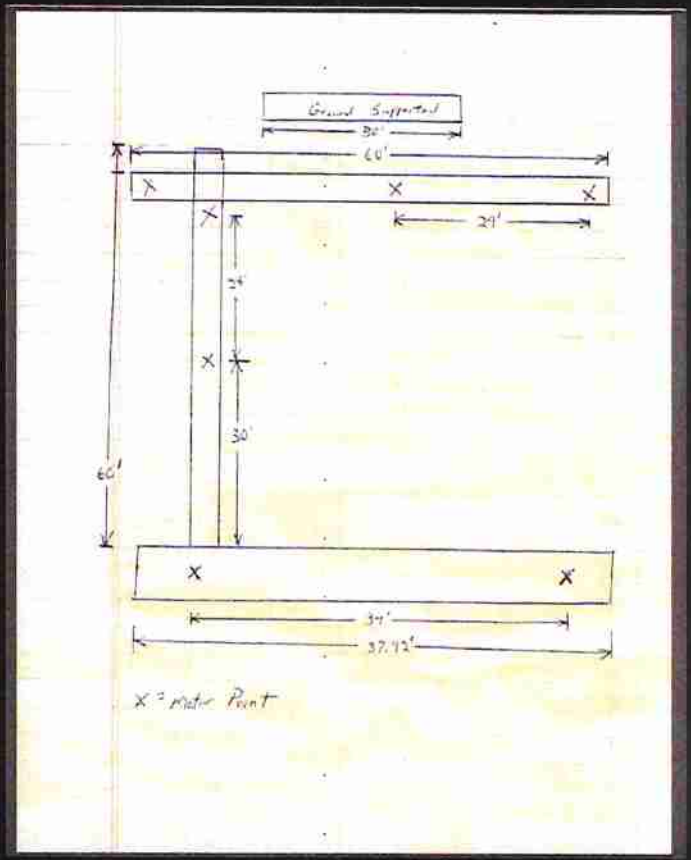
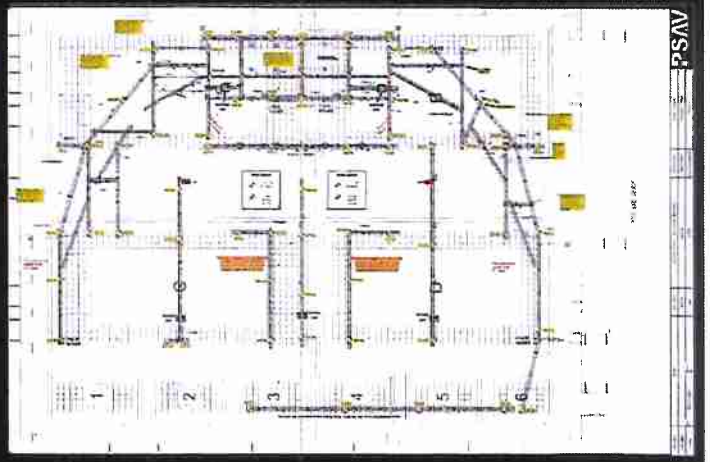


# BEHIND THE SCENES OF A RIGGING ADVANCE

## WHAT DOES THE RIGGING COORDINATOR DO?

- Rigging Coordinator is responsible for ensuring the plot and rigging is approved and safe.
  - RC will contact client to let them know their advance has been received and being processed.
  - Passes necessary information along to the teams at the property.
  - Evaluates plot and does load calculations to make sure no point or piece of hardware is being used past it's safe working load limit.
  - Schedules all labor and equipment needed for the show
  - Sends out approved plot to necessary parties.
  - At times, conducts on site supervision and management of rigging events.

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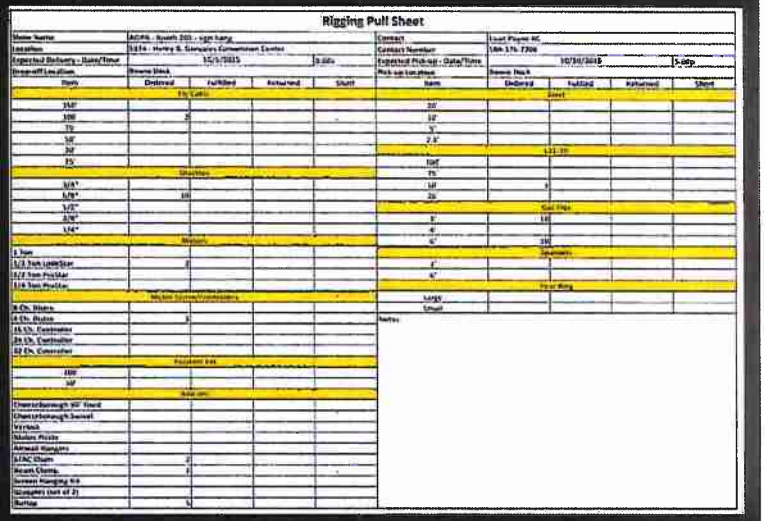
# RIGGING EQUIPMENT TRANSFERS

- Rigging Equipment Property Transfers
  - Property to property rigging gear requests and transfers will be handled by the inventory manager of each property.
  - Rigging Coordinator will submit a pull sheet for all needed rigging equipment for each show with the Rigging Advance.
  - Inventory manager will be responsible for acquiring all equipment that is needed for each show
    - Inventory on site
    - Property to Property
    - PGE
    - Outside Region
    - Rental



**Rigging Pull Sheet**

| Item | Ordered | Fulfilled | Returned | Short | Item | Ordered | Fulfilled | Returned | Short |
|---|---|---|---|---|---|---|---|---|---|
| Show Name | ACPA - Spark 201 - sign hang | | | | Contact | Lost Player RC | | | |
| Location | 1414 - Henry B. Gonzales Convention Center | | | | Contact Number | 504-176-7306 | | | |
| Expected Delivery - Date/Time | 10/6/2015 | | 9:00a | | Expected Pick-up - Date/Time | 10/10/2015 | | 5:00p | |
| Drop-off Location | Dock | | | | Pick-up Location | Dock | | | |
| **Rigging** | | | | | **Steel** | | | | |
| 150' | | | | | 20' | | | | |
| 100' | 2 | | | | 10' | | | | |
| 75' | | | | | 5' | | | | |
| 50' | | | | | 2.5' | | | | |
| 30' | | | | | **Cable** | | | | |
| 15' | | | | | 100' | | | | |
| **Shackles** | | | | | 75' | | | | |
| 3/8" | | | | | 50' | 1 | | | |
| 1/2" | 10 | | | | 20' | | | | |
| 5/8" | | | | | **Gas Pipe** | | | | |
| 3/4" | | | | | 8' | | | | |
| **Motors** | | | | | 4' | | | | |
| 1 Ton | | | | | 2' | 10 | | | |
| 1/2 Ton LoMOtor | 2 | | | | **Spanners** | | | | |
| 1/2 Ton ProMotor | | | | | 2" | | | | |
| 1/4 Ton ProMotor | | | | | 4" | | | | |
| **Motor Spots/Foundations** | | | | | **Tent Ring** | | | | |
| 8 Ch. Stage | | | | | 14'x9' | | | | |
| 4 Ch. Pulse | 3 | | | | 10'x10' | | | | |
| 16 Ch. Controller | | | | | Notes: | | | | |
| 24 Ch. Controller | | | | | | | | | |
| 32 Ch. Controller | | | | | | | | | |
| **Equipment Box** | | | | | | | | | |
| 100 | | | | | | | | | |
| 50' | | | | | | | | | |
| **Rental** | | | | | | | | | |
| Chainsaw w/ Fuel | | | | | | | | | |
| Chainsaw w/ Sweat | | | | | | | | | |
| Vertical | | | | | | | | | |
| Motor Plate | | | | | | | | | |
| Airwall Hanging | | | | | | | | | |
| 1/4C Chain | 2 | | | | | | | | |
| Beam Clamp | 2 | | | | | | | | |
| Screen Hanging Kit | | | | | | | | | |
| Scoopies (set of 2) | | | | | | | | | |
| Dollar | 5 | | | | | | | | |

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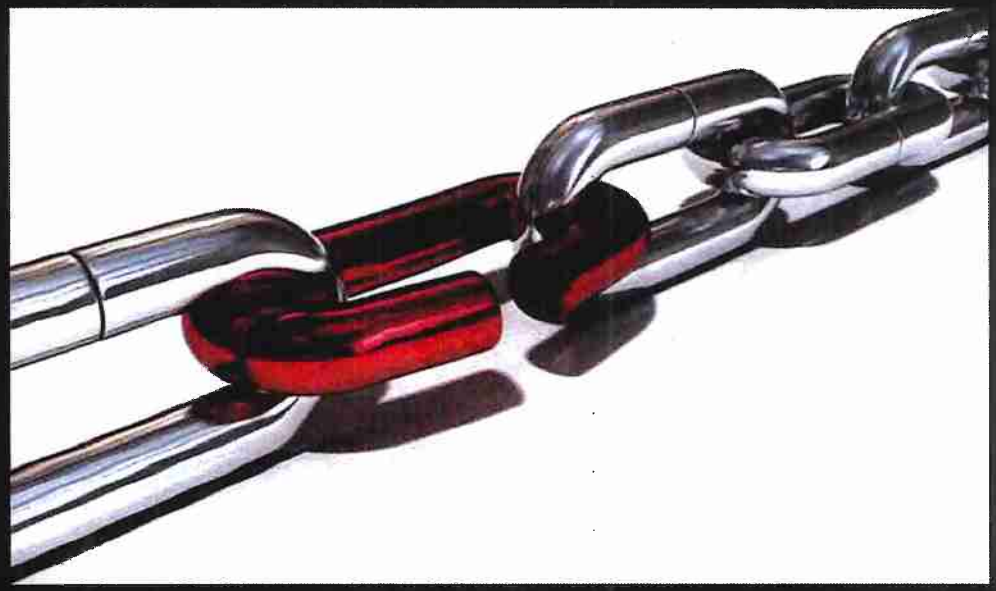
# LIABILITY

- NEGLIGENCE – Failure to exercise the degree of care ordinarily expected from a reasonably prudent person under the same circumstances.

- CRIMINAL NEGILGENCE – A gross deviation from the standard of care expected of a reasonable person that renders one criminally liable. Any action or an omission in reckless disregard of the consequences to the safety or property of another.



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# LIABILITY

- Liability is not only a concern of the employees physically performing the rigging
- All phases of the rigging process must be properly performed to provide maximum safety and liability protection
- These include installation, inspection, advancing, load calculations, and the physical rigging itself

# Rigging Sales SOP

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# RIGGING SERVICES SALES SOP

- Rigging Equipment
  - Chain motors, attachment hardware, truss, chain motor control, rigging points, scissor lifts, personnel lifts, and related cabling are the items included in rigging equipment.
- Pricing
  - All rigging equipment prices have been established as a day rate. Please refer to your price book for all rigging equipment rates.
- Sales Guidelines
  - A One Day Event should be billed as 1 Billable Day
  - Two, Three, and Four Day Events should be billed as 2 Billable Days (2-day week)
  - Five, Six, and Seven Day Events should be billed as 3 Billable Days (3 day week)

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# RIGGING SERVICES SALES SOP

- Rigging Point Package
  - All locations have access to the following package in Helios/Navigator which is all inclusive per point.
  - Package pricing is based on the sum of the parts so it will be important that the package you build includes all items outlined below:
    - Chain Motor ½ Ton – Qty 1
    - Chain Motor Controller CH – Qty 1
    - Chain Motor Fly Cable – Qty 1
    - Rigging Shackle – Qty 2
    - GAC Flex – Qty 2
    - Rigging Hang Point – Qty 1

| Rigging Point Package | QTY |
|---|---|
| Chain Motor 1/2 Ton | 1 |
| Chain Motor Controller CH | 1 |
| Chain Motor Fly Cable | 1 |
| Rigging Shackle | 2 |
| GAC Flex | 2 |
| Rigging Hang Point | 1 |

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# RIGGING SERVICES SALES SOP

- Rigging Labor
  - All riggers must be PSAV qualified or possess an ETCP certification to perform work on PSAV events and be dedicated specifically and exclusively to rigging tasks.
  - All rigging calls should include a minimum of two riggers as a safety precaution.
  - Rigging labor calls should be billed at a minimum of 4 hours based on the specialized nature of rigging services.
  - Additional labor standards may apply based on the union requirements or specific needs of your venue.

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Approved training for ETCP renewal credits

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# Rigging SOP: Property Level Operations

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# RIGGING SOP: PROPERTY LEVEL OPERATIONS

- **Property Level Rigging Standard Operating Procedures**
  - PSAV's Rigging Services is committed to safety, achieved in part by relying upon the diligent efforts of our property-level teams to treat every rigging event with the attention to detail it deserves. Any questions should be escalated to the area Rigging Coordinator (RC) or Regional Rigging Manager (RRM).
  - Regardless of contract status, properties utilizing any rigging equipment, labor, or services, whether billable or non-billable, must adhere to the procedural responsibilities outlined within this SOP.

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# RIGGING SOP: PROPERTY LEVEL OPERATIONS

## Responsibility

- The Director of Event Technology (DET) or designate is responsible for ensuring their team adheres to this SOP at their respective venues. This includes unions, private vendors, labor supply companies, and contracted in-house labor.

- The RRM and RC are responsible for all technical rigging decisions and are in place to support the DET and property team in rigging operations.

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# RIGGING SOP: PROPERTY LEVEL OPERATIONS

## Labor

- Only rigging labor evaluated and approved by RRM (or their designee) may rig in PSAV properties. Any under-skilled or unqualified riggers must be reported to the DET and/or RC to be evaluated by Rigging Services before being allowed to perform further rigging and/or rigging related tasks. RRM can be contacted for more information.

- The RRM, RC, and Lead Rigger are responsible for ensuring the appropriate riggers are scheduled on all events that utilize rigging. All rig calls must have a minimum of two riggers unless previously approved by the RRM. The DET is responsible for scheduling rigging labor if an RC is not in place.

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# RIGGING SOP: PROPERTY LEVEL OPERATIONS

- **Operations at Rigging Locations**

- Scheduling
  - A Rigging Shift may be scheduled after the following list has been completed:
    - » Rigging Advance has been submitted
    - » A plot has been approved by the RC, Lead Rigger, or RRM
    - » A quote has been sent to and approved by client
- Appearance
  - All riggers will adhere to property appearance standards agreed upon between DET and RRM. The DET shall communicate these standards and any exceptions to all scheduled riggers prior to their shift. Riggers failing to meet the published (or discussed) dress code and appearance standards may be sent home.
  - Neckties are not to be worn when in contact with chain hoists.

| PSAV LA/OC Rigging Schedule For | | | 1/8/2018 | | | to | 1/14/2018 | | Version | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date | Event Name | Property | Lead In | Lead Out | Time In | Time out | Lead Rigger | Rigger 1 | Rigger 2 | Rigger 3 |
| Monday, January 8, 2018 | MTA | Waste Elimination | IN | | 7:00 AM | 4:00 PM | [illegible] | [illegible] | [illegible] | |
| Monday, January 8, 2018 | Cisco Summit GEO | Hilton Anaheim - CAL & FAC | IN | | 8:00 AM | 5:00 PM | [illegible] | [illegible] | | |
| Tuesday, January 9, 2018 | Cisco - Automation Northrough | ACC - Hall D | SHOW | | 1:00 PM | 6:00 PM | [illegible] | | | |
| Wednesday, January 10, 2018 | Little Chamberlain | Tacoma Resort | IN | | | | [illegible] | [illegible] | | |
| Wednesday, January 10, 2018 | NAFS 2018 | PCC | IN | | 8:00 AM | 5:00 PM | [illegible] | [illegible] | [illegible] | |
| Wednesday, January 10, 2018 | Amway GSC | Hyatt HB - Grand | | OUT | 2:30 PM | 7:30 PM | [illegible] | [illegible] | | |
| Wednesday, January 10, 2018 | American Foods | Intercon DTLA - Wilshire II | IN | | 5:00 PM | 10:00 PM | [illegible] | [illegible] | | |
| Thursday, January 11, 2018 | Hilton Anaheim Hidden Parks | Hilton Anaheim | IN | | 7:00 AM | 4:00 PM | [illegible] | [illegible] | | |
| Thursday, January 11, 2018 | Grid Metal Fortnightly | ACC - North 200 | IN | | 8:00 AM | 4:00 PM | [illegible] | [illegible] | [illegible] | [illegible] |
| Thursday, January 11, 2018 | Cisco - Automation | ACC - Hall D | SHOW | | 9:00 AM | 1:00 PM | [illegible] | | | |
| Thursday, January 11, 2018 | Cisco Summit 2018 | Anaheim Marriott - Marriott | | OUT | 8:00 AM | 1:00 PM | [illegible] | [illegible] | | |
| Thursday, January 11, 2018 | Cisco Summit GEO | Hilton Anaheim - CAL & FAC | | OUT | 8:00 AM | 1:00 PM | [illegible] | [illegible] | | |
| Thursday, January 11, 2018 | Cisco | ACC - Hall D | | OUT | 1:00 PM | 6:00 PM | [illegible] | [illegible] | [illegible] | [illegible] |
| Thursday, January 11, 2018 | American Foods | Intercon DTLA | | OUT | 4:30 PM | 2:30 AM | [illegible] | [illegible] | | |
| Thursday, January 11, 2018 | Omnium | Marriott LAX | | OUT | 10:00 PM | 3:00 AM | [illegible] | [illegible] | | |
| Thursday, January 11, 2018 | Hilton Anaheim Hidden Parks | Hilton Anaheim | | OUT | 11:00 PM | 1:00 AM | [illegible] | [illegible] | | |
| Friday, January 12, 2018 | | | | | | | | | | |

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# Aerial Acts

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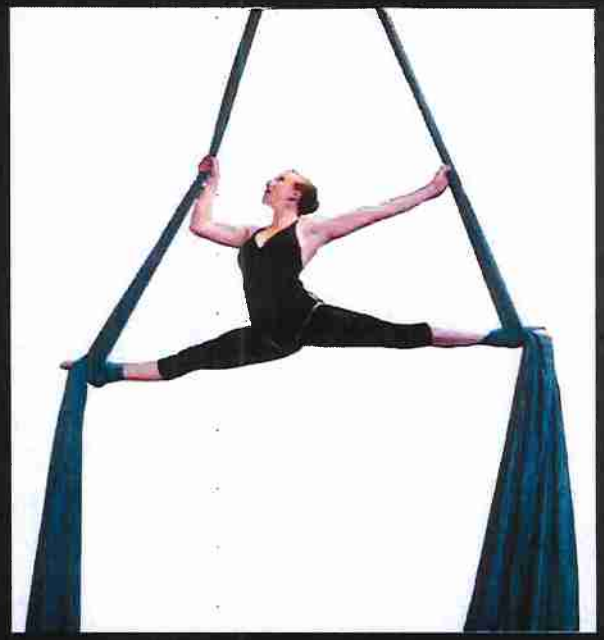
# AERIAL ACTS

## First Steps

- Rigging Advance
  - » Aerial acts can take weeks of information gathering and approval
  - » Please start the process as early as possible by instructing clients to fill out Rigging Advance form online
  - » Typical suggested lead time is 4-6 weeks for aerial acts

- Responsibilities
  - » It is the responsibility of the location DET or Sales Manager to acquire all necessary information for the aerial act
  - » Rigging services is responsible for approval of the overall safety aspects of the act
  - » Risk Management is responsible for final approval of all documents



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# AERIAL ACTS

## Information Gathering and Approval Process

- Insurance
  - » Send instructions for certificates of insurance directly to client, producer, and aerial act company
  - » $5 million in insurance is required by each
  - » The wording of the description section must specifically state what is listed in the instructions document
  - » The certificate holder of the certificate must specifically list PSAV and address as shown in the instructions
  - » Special event insurance may be purchased by clients through Albert Eon insurance – Ask RRM for document
  - » If all insurance requirements are not met the act will not be allowed to proceed!
- Waiver and Release
  - » Each performer must sign waiver and release on site
  - » Witness can be PSAV Director or Manager
  - » Send to Risk Management once signed

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# AERIAL ACTS

## Operational Rules and Standards

- Scheduling
  - » Rigging Coordinator will schedule riggers to set and strike the rounds for the aerial act
  - » AV or Lead Rigger should be on site for attachment of apparatus, rehearsals, and show call
- Rules
  - » PSAV employees will not make any attachments of aerial apparatus to our point
  - » Riggers may take aerialist up to point and show them where to attach
  - » PSAV employees will not act as puller labor
  - » PSAV chain motors can not be used as part of an aerial act
  - » Outside companies are permitted to bring in flying winches since PSAV does not provide this type of equipment
  - » Point ratings are reduced by 50% when used for aerial acts

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# Rigging Hardware

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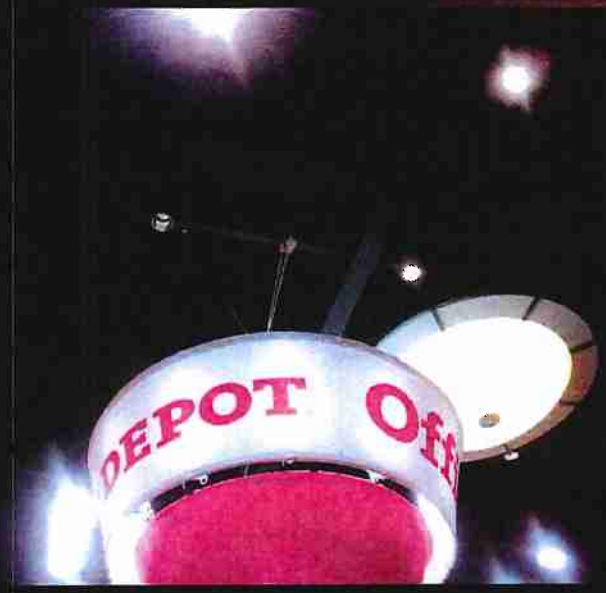
# BASIC RIGGING EQUIPMENT

- Inspection!



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# BASIC RIGGING EQUIPMENT

- Rigging Points
- Chain Hoists (Motors)
- Motor power and control system (Distro)
- Truss
- Shackles
- Roundslings (GACflex)
- Personnel Lifts
- Verlocks

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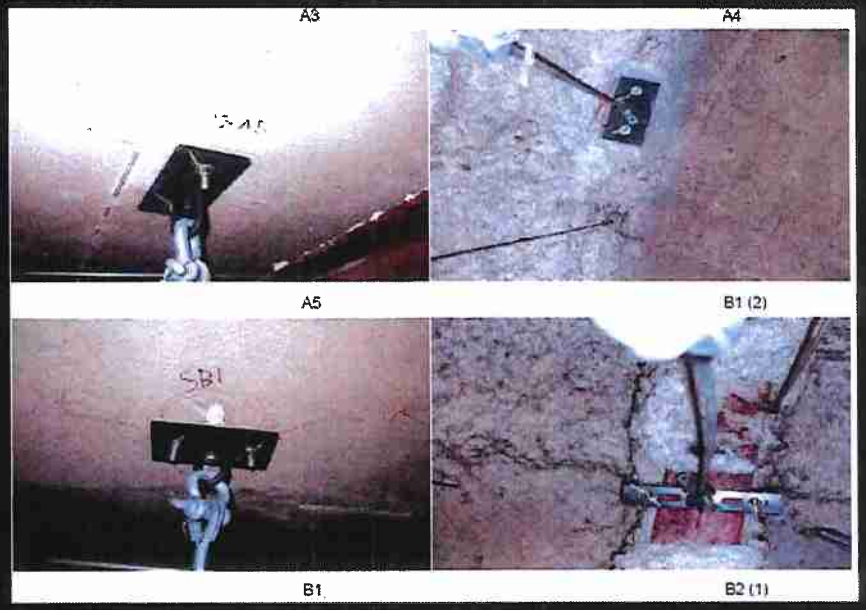
# BASIC RIGGING EQUIPMENT

- Rigging Point
  - Can be permanent or temporary
  - Rated for motorized loading
    - Cyclical or dynamic loading (150%)
    - Design factor of at least 5:1
  - PSAV holds engineering on permanent points or on beams for temporary points.

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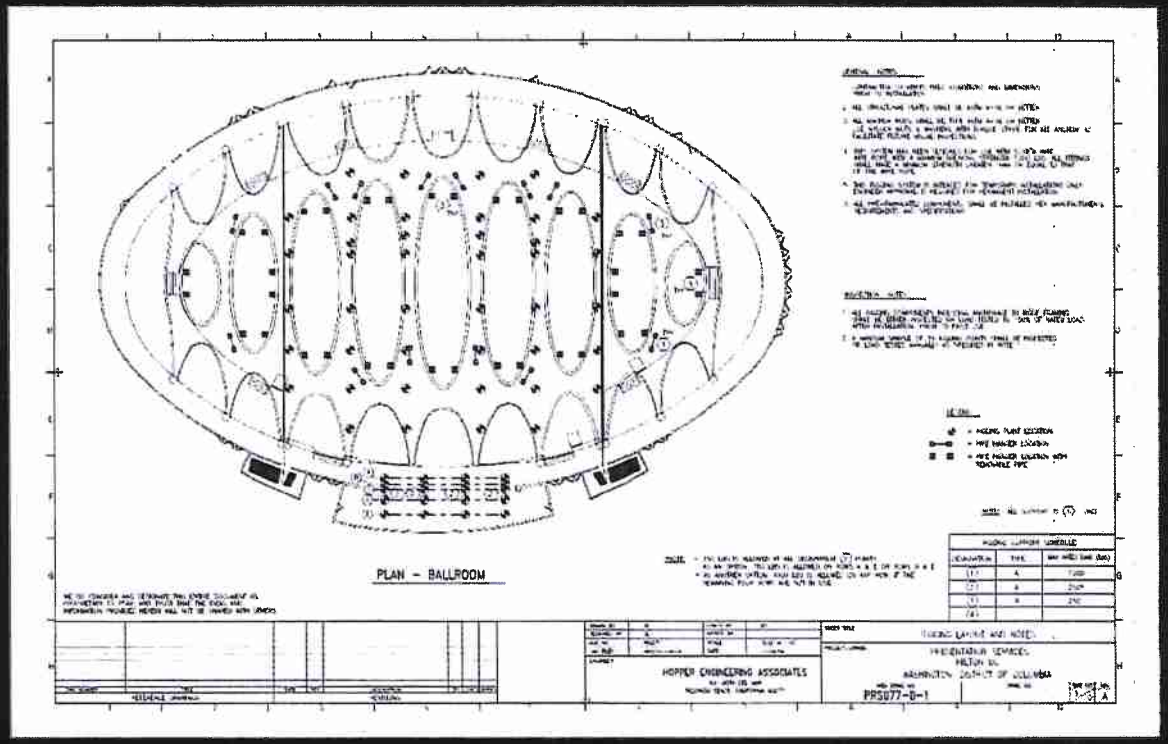
# BASIC RIGGING EQUIPMENT

- Engineering

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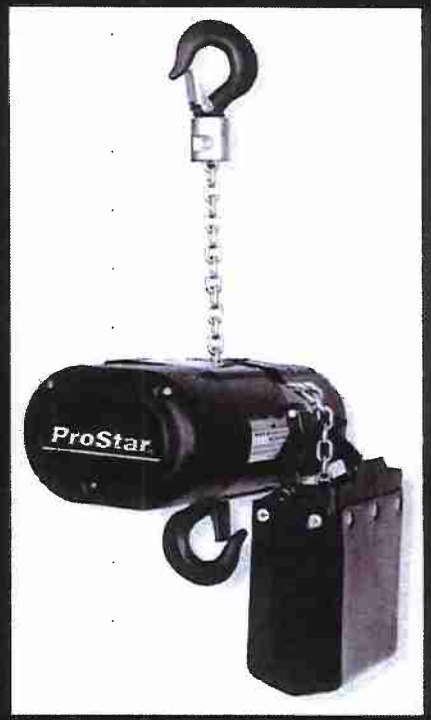
# BASIC RIGGING EQUIPMENT

## Chain Hoists

- The most commonly used chain hoists for PSAV are CM ProStars
  - May also see CM Lodestar, Stagemaker (SR01, SR05)
- Most PSAV hoists are double reeved ¼ ton CM Prostars
- Double reeving doubles the load capacity of the hoist
  - ¼ ton hoist will safely lift ½ ton (1000lbs)
- PSAV hoists are inspected and certified annually to manufacturer and ANSI spec.
- Twisted Chain, Capsized hooks, Gates, Oh my!

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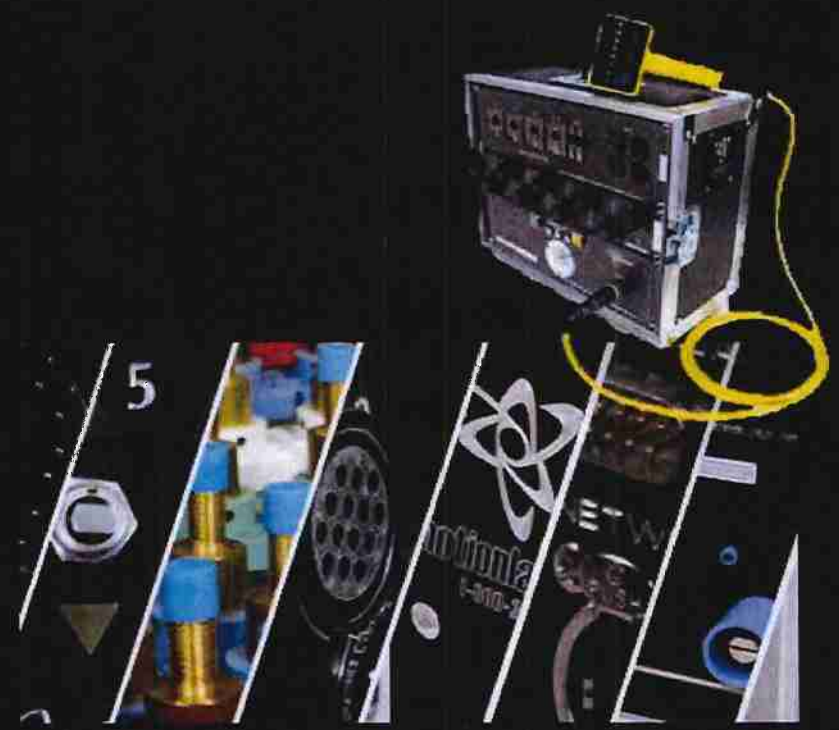
# BASIC RIGGING EQUIPMENT

- Control and Power
  - The heart of the control system is the controller (distro)
  - The distro receives power from the venue and distributes it to the chain hoists
  - The chain hoists are raised and lowered with a pendant or pickle



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# BASIC RIGGING EQUIPMENT

- Pickles
  - Deadman Safety Switch
- 7 Pin Cable
  - MUST POWER OFF THE SYSTEM

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# BASIC RIGGING EQUIPMENT

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# BASIC RIGGING EQUIPMENT

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# BASIC RIGGING EQUIPMENT

- Truss
  - Truss is used in entertainment rigging to suspend equipment such as lighting, audio, video, or scenic elements
  - Truss is made of welded aluminum tubing
  - Trusses are wrapped with GAC Flex and raised with chain hoists.
  - Truss is easily damaged by steel C clamps, wire rope, improper storage and transport, overloading, etc.
    - MUST USE PROTECTIVE CLIPS (Truss Condoms)

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# BASIC RIGGING EQUIPMENT

- Truss Continued
  - Truss comes in many different sizes and configurations
    - Most common PSAV size is 12"x12" with plated ends
  - Other options: 12"x18", 16"x16", and 20.5"x20.5" in either plated or spigoted
  - Common lengths are 5', 8', and 10'
  - Truss junctions can be Corner Blocks or Grapples/Tabs

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# BASIC RIGGING EQUIPMENT

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# BASIC RIGGING EQUIPMENT

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# BASIC RIGGING EQUIPMENT

- Shackles
  - Shackles are used to connect rigging hardware including motors, steel wire, GAC Flex, and spansets
  - We most commonly use ½" and 5/8"
  - Must be used in correct orientation and way. No side loading!
  - Collector Device (Along with Pear Rings)

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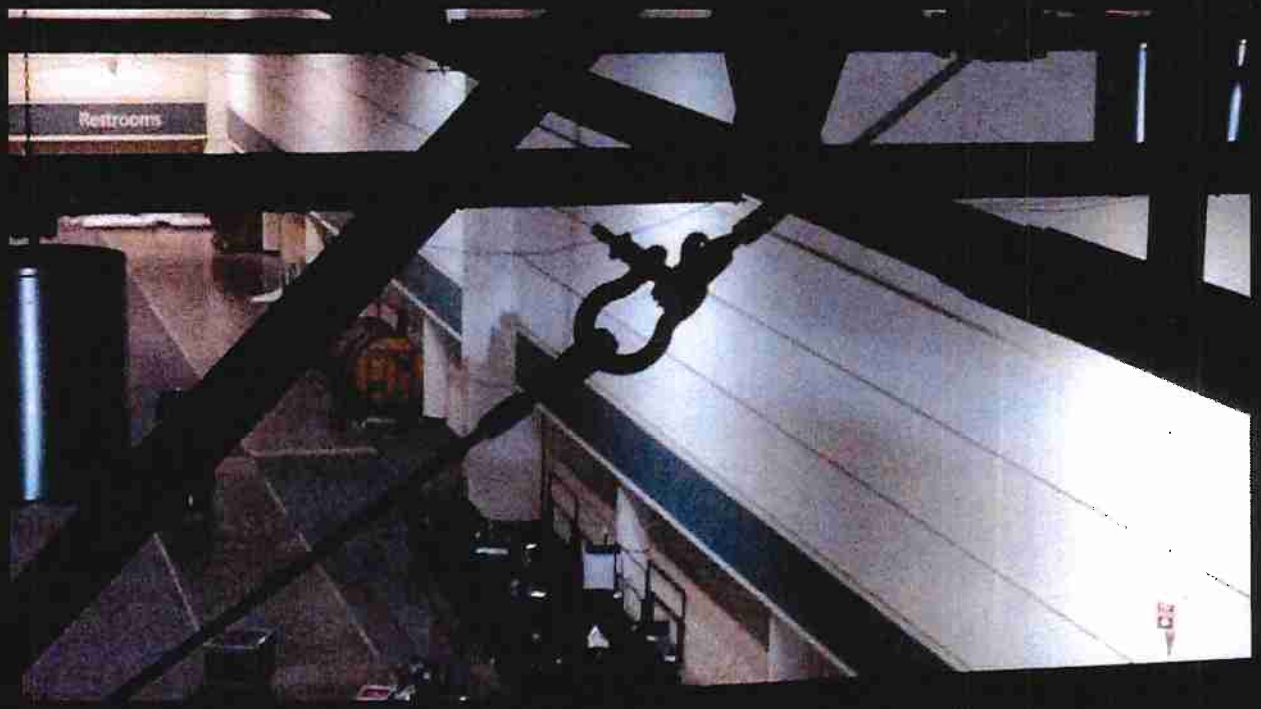
# BASIC RIGGING EQUIPMENT

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# BASIC RIGGING EQUIPMENT

- Roundslings
  - More commonly referred to as GAC Flex or Spansets
  - They are used to sling trusses, attach cable picks, and make connections to structures
  - The load bearing portion of the sling is a continuous coil of polyester or steel loops.
  - These loops are covered with an outer sheath designed to protect the load bearing loop inside.

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# BASIC RIGGING EQUIPMENT

- Roundslings Continued
  - PSAV uses GAC Flex to sling truss. It has a steel core and does not require a backup of wire rope for fire code compliance
  - Spansets are used primarily for strain relief of cables attached to trusses or cable picks
  - Common lengths are 3', 4', 6', and 9'

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# BASIC RIGGING EQUIPMENT

- Personnel Lifts
  - Scissor lifts are the most common type of lift used in ballroom rigging
  - Certain circumstances may require boom lifts or single person lifts (Runabouts
  - At least one lift is required for each rigging call and PSAV usually rents this to the client
  - All personnel operating lifts that work for PSAV must be certified operators.

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# BASIC RIGGING EQUIPMENT

- Verlocks
  - PSAV uses 10' and 14' Verlocks (1/8" cable)
  - Can be repaired if cable kinked or frayed
  - Use with ¼" Shackles and 8" Slings
  - Coil extra cable and secure
  - Where does excess coil hang?

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# INSTALLATION

## SCREENS

Step 1
Install Air wall hangers at appropriate width for the size screen us are using a couple of inches shorter than the width of the screen

Important note: This is a two person job!

PSAV
flawless performance. dramatic results.

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# INSTALLATION

## SCREENS

Step 2
Connect VerLock to Air wall hanger with ¼" Shackle

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# INSTALLATION

SCREENS

Step 3
Loosen Lock nut. (Be carful as the nut can come off if unscrewed to far)

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# INSTALLATION

## SCREENS

Step 4
Once the lock nut is loose press and hold the lock nut toward the shaft to unlock the cable and extend until the cable reaches the ground / screen

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# INSTALLATION

## SCREENS

Step 5 - 1
Connect the loose end of the VerLock cable to the screen using 8" Sling and ¼" shackle.

For Standard fast fold screen you will wrap the frame near the corner.

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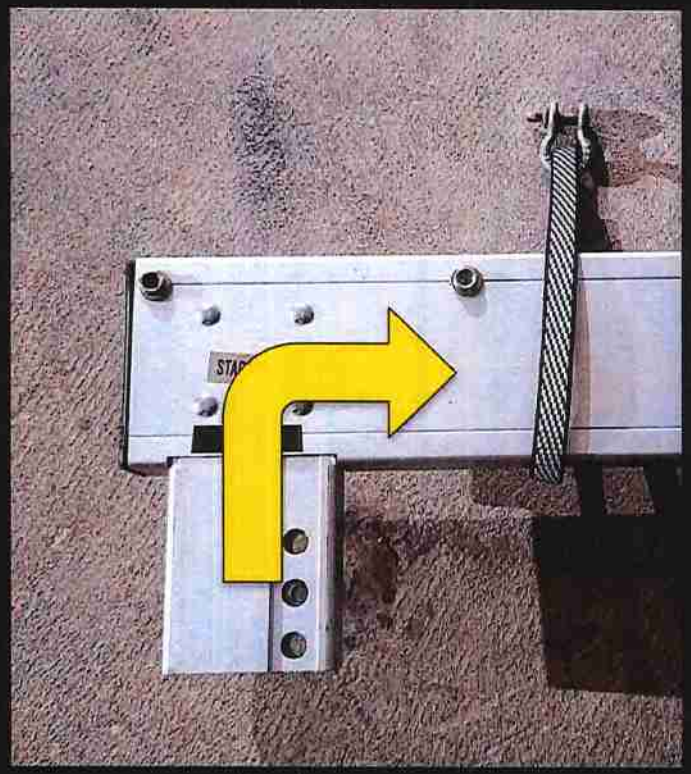
# INSTALLATION

## SCREENS

Step 5 - 2
For Deluxe Fast Fold screens you will want to slip the top frame section thru the 8" sling before the screen is assembled. Keep sling near corner.



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# INSTALLATION

## SCREENS

Step 6
Once all attachments are made you will start to pull the cable thru the VerLock lifting the screen

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# INSTALLATION

## SCREENS

Step 7
Once the screen is at height and level tighten the Lock Nut to secure the screen in place

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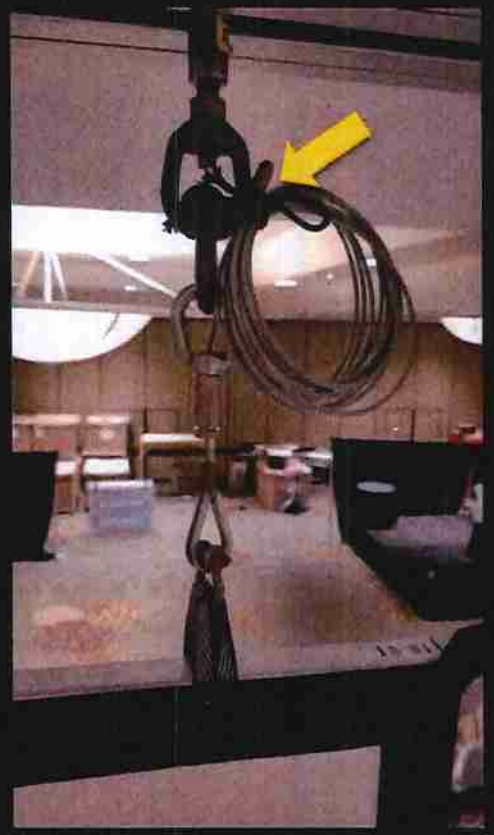
# INSTALLATION

## SCREENS

Step 8
Coil up the remaining cable and use tie line to secure it to the air wall hanger



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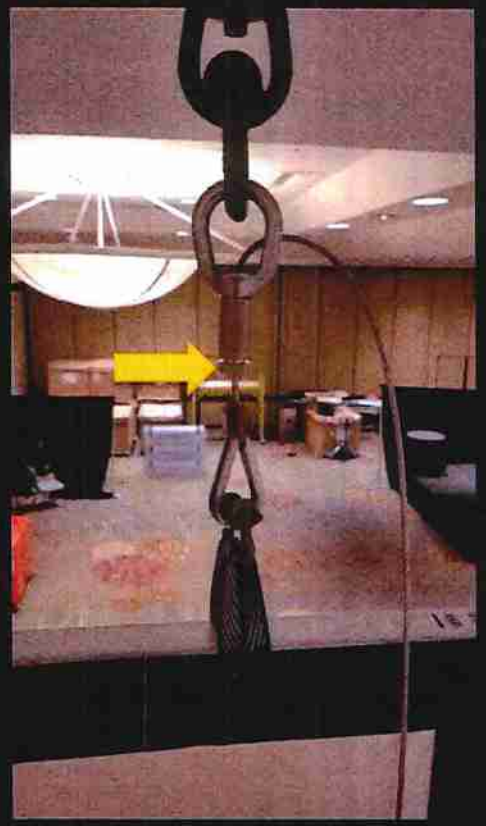
# INSTALLATION

## SCREENS

Step 9
To Lower the screen, untie the excess cable so that it is free and loosen the lock nut



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# INSTALLATION

SCREENS

Step 9
Grab onto the cable below the VerLock then press the Lock Nut toward the VerLock shaft. This will free the cable to lower the screen.

**IMPORTANT NOTE**: Do not grab from the cable From above. Once you loosen the cable the weight of the screen will pull the cable down and you can get you skin pinched in the top of the VerLock

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# Ground Support Truss SOP

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# GROUND SUPPORT SOP

- All ground supported truss structures must fall within engineering guidelines with correct ballast weight and base size depending on desired height and load applied. (See load requirement chart on engineering document for the correct application.)
- Engineering documentation for ground supported truss assembly is for indoor use only.
- All truss and related hardware must be inspected both before and after assembly

# GROUND SUPPORT SOP

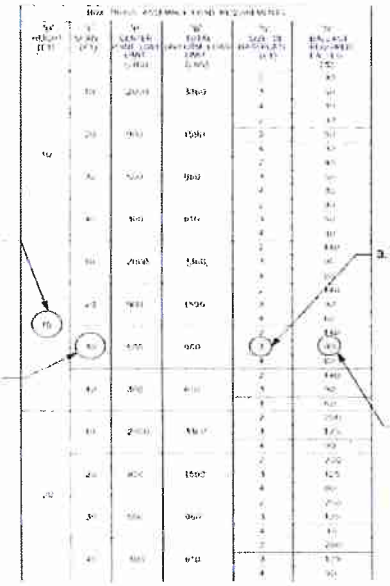
- Base plate weight may be included as part of the total ballast weight required for each application
- The truss assembly must be placed on level ground. Ground must be capable of supporting the load of the truss assembly.
- A three (3) person team should be used when erecting each tower. One person to foot the base plate to prevent sliding, while a two person team lifts the tower to its vertical position.

# GROUND SUPPORT SOP

- Truss assembly must be vertical with ballast weight applied to the base plate before equipment may be added to the truss

- Regional Managers of Rigging Services and Rigging Coordinators / Supervisors have full authority and responsibility to approve indoor ground supported structures for your event

**Loading Chart Example:**
Goal post assembley 15' high 25' wide with 3'x3' base plates. The truss assembly will have a total load of 125lbs



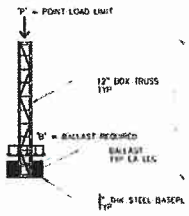
1. Select Tower truss height

2. Select appropriate Span. (25' feet is not listed so you will select the lowest span that is greater than 25').

3. Select base plate size.

4. Resultant is ballast requirment for EACH tower leg as a percent of Load

**Ballast Calculation for above example:**
Goal post assembly 15' high 25' wide with 3'x3' base plates requires a ballast of 90% per tower.
90% of Load (125 lbs) = 112.5 lbs of ballast per each tower. (base plate weight should be included in ballast weight)




FRONT ELEVATION

SIDE ELEVATION

TOP VIEW

ISOMETRIC

SINGLE TRUSS TOWER/LIGHT TREE

FOR INDOOR USE ONLY

| BOX TRUSS ASSEMBLY LOAD REQUIREMENTS | | | |
|---|---|---|---|
| 'H' HEIGHT (FT) | 'P' MAXIMUM POINT LOAD LIMIT (LBS) | 'S' SIZE OF BASEPLATE (FT) | 'B' BALLAST REQUIRED (%) |
| 10 | 500 | 2 | 150 |
| | | 3 | 75 |
| | | 4 | 40 |
| 15 | 500 | 2 | 260 |
| | | 3 | 150 |
| | | 4 | 95 |
| 20 | 500 | 2 | 375 |
| | | 3 | 225 |
| | | 4 | 150 |

| REFERENCE DRAWINGS | REVISIONS |
|---|---|

HOPPER ENGINEERING ASSOCIATES

PLAN, NOTES & DETAIL

PRESENTATION SERVICES
GROUND SUPPORTED TRUSS
LOAD REQUIREMENTS

PRS163-D-1

A

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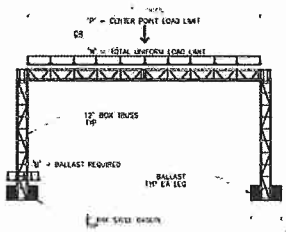
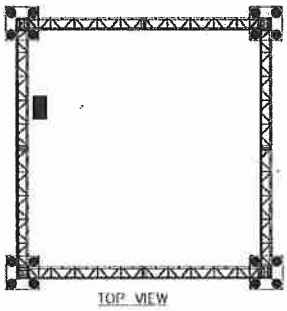
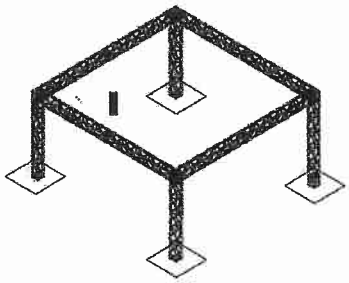


| BOX TRUSS ASSEMBLY LOAD REQUIREMENTS | | | | | |
|---|---|---|---|---|---|
| "L" HEIGHT (FT) | "L" SPAN (FT) | "P" CENTER POINT LOAD LIMIT (LBS) | "W" TOTAL UNIFORM LOAD LIMIT (LBS) | "S" SIZE OF BASEPLATE (FT) | "B" BALLAST REQUIRED EA LEG (LB) |
| 10 | 20 | 600 | 1500 | 2 | 10 |
| | | | | 3 | |
| | | | | 4 | |
| 15 | 20 | 900 | 1500 | 2 | 15 |
| | | | | 3 | |
| | | | | 4 | |
| 20 | 20 | 900 | 1500 | 2 | 20 |
| | | | | 3 | |
| | | | | 4 | |




BOX STRUCTURE

| REFERENCE DRAWINGS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DWG NUMBER | TITLE | DATE | REV | DESCRIPTION REVISIONS | BY | CHK'D | DWG NUMBER |

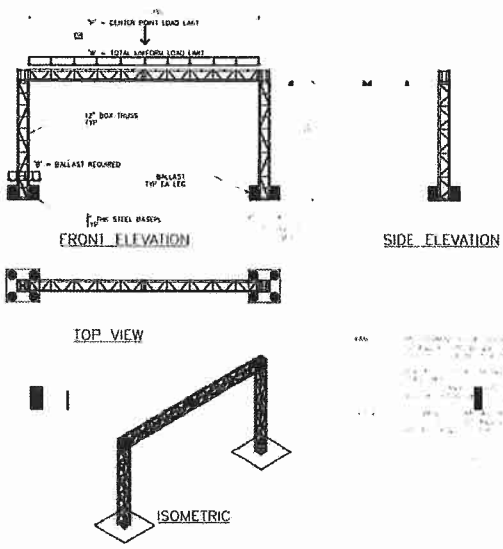
| | | | |
|---|---|---|---|
| DRAWN BY | | CHK'D BY | |
| CLIENT'S BY | | APVD BY | |
| JOB NO | | SCALE | |
| DWG TITLE | | DATE | |

hea HOPPER ENGINEERING ASSOCIATES
203 NORTH BILL MOY
BROKEN ARROW, OKLAHOMA 74011

SHEET TITLE: PLAN, NOTES & DETAIL

PROJECT/OWNER: PRESENTATION SERVICES
GROUND SUPPORTED TRUSS
LOAD REQUIREMENTS

| HEA DWG NO | DWG NO | REV |
|---|---|---|
| PRS165-D-1 | | A |

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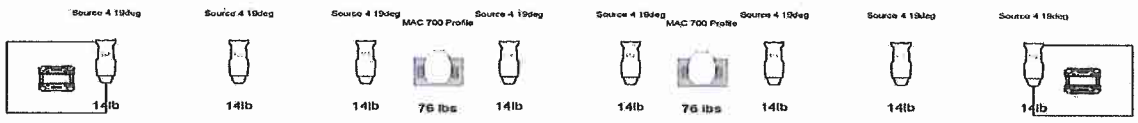
BOX TRUSS ASSEMBLY LOAD REQUIREMENTS

| 'H' HEIGHT (FT) | 'L' SPAN (FT) | 'P' CENTER POINT LOAD LAMT (LBS) | 'W' TOTAL UNIFORM LOAD LAMT (LBS) | 'S' SIZE OF BASEPLATE (FT) | 'B' BALLAST REQUIRED EA LEG (%) |
|---|---|---|---|---|---|
| 10 | 10 | 2000 | 3360 | 2 | 90 |
| | | | | 3 | 50 |
| | | | | 4 | 30 |
| | 20 | 900 | 1590 | 2 | 90 |
| | | | | 3 | 50 |
| | | | | 4 | 30 |
| | 30 | 500 | 960 | 2 | 90 |
| | | | | 3 | 50 |
| | | | | 4 | 30 |
| | 40 | 500 | 610 | 2 | 90 |
| | | | | 3 | 50 |
| | | | | 4 | 30 |
| 15 | 10 | 2000 | 3200 | 2 | 140 |
| | | | | 3 | 90 |
| | | | | 4 | 60 |
| | 20 | 900 | 1590 | 2 | 140 |
| | | | | 3 | 90 |
| | | | | 4 | 60 |
| | 30 | 500 | 960 | 2 | 140 |
| | | | | 3 | 90 |
| | | | | 4 | 60 |
| | 40 | 500 | 610 | 2 | 140 |
| | | | | 3 | 90 |
| | | | | 4 | 60 |
| 20 | 10 | 2000 | 3200 | 2 | 200 |
| | | | | 3 | 125 |
| | | | | 4 | 90 |
| | 20 | 900 | 1590 | 2 | 200 |
| | | | | 3 | 125 |
| | | | | 4 | 90 |
| | 30 | 500 | 960 | 2 | 200 |
| | | | | 3 | 125 |
| | | | | 4 | 90 |
| | 40 | 500 | 610 | 2 | 200 |
| | | | | 3 | 125 |
| | | | | 4 | 90 |

| | | | | | |
|---|---|---|---|---|---|
| DRAWN BY: | | CHK'D BY: | | SHEET TITLE: | PLAN, NOTES & DETAIL |
| DESIGNED BY: | | APPV'D BY: | | PROJECT/OWNER: | PRESENTATION SERVICES GROUND SUPPORTED TRUSS LOAD REQUIREMENTS |
| JOB NO.: | | SCALE: | | | |
| CAD FILE: | | DATE: | | | |
| ENGINEER: | HOPPER ENGINEERING ASSOCIATES 300 VISTA DEL MAR REDONDO BEACH, CALIFORNIA 90277 | | | HEA DWG NO: PRS163-D-1 | DWG NO: |
| REFERENCE DRAWINGS | | REVISIONS | | | REV: A |




Mac 700's = 152#
Lekos = 112#'s

**Total Load = 264 #'s**

Structural Engineering Data for a 10' high
30' wide Truss Arch with a 3' base plate requires
a 50% ballast load per tower.

Ballast for each tower is 50% of 264 lbs
264 * .5 = 132 lbs (Ballast required)
132 lbs - 40 lbs (Base plate)
92 lbs of additional weight per side
* 3 - 35lbs Sand Bags per side *

DRAWING NAME

PSAV

Ground Support Example 1
10'h x 30'w Arch

F.P. 1

# GROUND SUPPORT REASONS

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# GROUND SUPPORT REASONS

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# Airwall Hanging SOP

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# AIR-WALL HANGING SOP

- The venue approves PSAV to hang from the air-wall track
- Air-wall track structure, condition, and physical capabilities are verified and recorded
- Staff understand the approved and appropriate usage of air-wall attachment hardware
- Staff have been trained on proper air-wall attachment methods

# AIR-WALL HANGING SOP

- Only PSAV approved air-wall hangers, on a per show basis, shall be used. All equipment inspected before and after use
- Non-motorized "dead hangs" only;
  - Chain motors should never be used on air-wall track
- 10 feet is the max length that may be suspended from an airwall track
- Max of 100lbs/ 1 hanger every 4 feet on the airwall track
  - Exception is safety tie offs or cable picks at track end

# Further Training

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# TRAINING

- 3 Day Rigging Class - Orlando
  - When completed, the candidate possesses a basic knowledge of rigging skills and must continue their training locally. (250 hrs)
  - The class does not "certify" riggers or necessarily make them an approved rigger after completion. "PSAV Qualified"
  - The RC or RRM must evaluate all trainees prior to scheduling them on rigging shifts.
  - Trainees be placed on rigging calls as an extra person to gain on the job training.

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# Today's Hands-On Training

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# TODAY'S GOALS

- Demonstrate multiple ways to wrap truss with GAC Flex
- How to properly layout gear for a rig
- Hang/Strike a Fast Fold on the Screen Points
- Hang/Strike the Line Array
- Assemble Hang/ (Strike) the FOH Truss
- 2 Motor Hang with Truss and power
  - Fly to 3', **. and Land
- Proper inspection, cleanup, and storage of rigging gear

- ** If time allows, Bad Rig Contest!

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# TODAY'S GOALS

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# Wrap Up

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# Gravity:

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# Gravity:
# It's always working

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Riggers have a ___%
Failure Option.

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# Riggers have a 0% Failure Option.

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See Something

Say Something

Do Something

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# THANK YOU

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