

## GENERAL NOTES AND OPERATIONS PLAN

### GOVERNING CODE

2018 INTERNATIONAL BUILDING CODE (BASED ON ASCE 7-16)  
ANSI E1.21

### DESIGN LOADS

1. ROOF LOAD:
  - A. STRUCTURE SELFWEIGHT
  - B. RIGGING LOADS: SEE ATTACHED RIGGING SKETCH IN APPENDIX.
  
2. WIND LOAD (PER ASCE 7):
  - A. SERVICE LEVEL BASIC WIND SPEED (BASED ON 3-SECOND GUST) = 90 MPH (115 MPH ULTIMATE) APPLIED TO THE STRUCTURAL FRAME AND PERMANENT ATTACHMENTS FOR AN "OPEN" CONDITION MULTIPLIED BY A REDUCTION FACTOR IN ACCORDANCE WITH ASCE 37.
  - B. SERVICE LEVEL BASIC WIND SPEED (BASED ON 3-SECOND GUST) = 40 MPH APPLIED TO THE STRUCTURAL FRAME AND PROJECTED AREAS OF THE SCRIMMED WALLS FOR THE "FULLY ENCLOSED" CONDITION AND "PARTIALLY ENCLOSED" CONDITION.
  - C. WIND REDUCTION FACTOR = 0.75 (BASED ON ASCE 37-02)
  - D. BUILDING CATEGORY = III
  - E. WIND IMPORTANCE FACTOR, I = 1.00
  - F. WIND EXPOSURE = C (ALL WIND DIRECTIONS)
  - G. INTERNAL PRESSURE COEFFICIENT PARTIALLY ENCLOSED,  $G_{Cpi} = +0.55, -0.55$

### CONSTRUCTION AND SAFETY

1. CONTRACTOR SHALL BRACE ENTIRE STRUCTURE AS REQUIRED TO MAINTAIN STABILITY UNTIL COMPLETE AND FUNCTIONING AS THE DESIGNED UNIT. Unless explicitly described elsewhere in these appendices, our scope includes only normal loading conditions occurring during use after the system has been installed, ballasted, and laterally stabilized in accordance with the system's required stabilizing system. Our scope does not include installation means and methods used during installation or removal of the system, occurring prior to or after the in-use condition.
2. ENGINEER SHALL NOT BE RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OF CONSTRUCTION SELECTED BY CONTRACTOR.



3. THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND IS NOT LIMITED TO NORMAL WORKING HOURS. WHEN ON SITE, THE ENGINEER IS RESPONSIBLE FOR HIS/HER OWN SAFETY BUT HAS NO RESPONSIBILITY FOR THE SAFETY OF OTHER PERSONNEL OR SAFETY CONDITIONS AT THE SITE.
4. THE ROOF IS A "SUN-SHADE" SYSTEM ONLY AND IS NOT INTENDED FOR PERSONNEL ACCESS OR SUPPORT. ROOF SYSTEM SHALL BE ACCESSED FROM THE TRUSS COMPONENTS ONLY.
5. ROOF SYSTEM ERECTION:
  - A. ROOF SYSTEM SHALL NOT BE HOISTED DURING WIND SPEEDS GREATER THAN 26 MPH.
  - B. WIRE ROPE X-BRACES SHALL BE INSTALLED IMMEDIATELY AFTER ROOF HAS BEEN HOISTED TO DESIGN ERECTION HEIGHT.
  - C. SELF-CONTAINED ERECTION HOISTS ARE INTENDED TO HOIST THE ROOF SYSTEM (ROOF TRUSSES) AND CHAIN HOISTS SUPPORTED BY THE ROOF SYSTEM ONLY. SELF-CONTAINED HOISTS ARE NOT INTENDED TO HOIST ANY COLLATERAL OR RIGGING LOADS.

#### **STRUCTURAL STEEL**

1. ALL DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO AISC SPECIFICATIONS FOR "DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS", AND THE AISC "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", LATEST EDITION.
2. WELDING SHALL BE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY (AWS D1.1:2002).
3. MATERIALS:
  - A. PLATES UNLESS NOTED: ASTM A36.
  - B. TUBE SHAPES (HSS): ASTM A500, GRADE B
  - C. BOLTS: GRADE 8 UNLESS NOTED.

#### **WIRE ROPE AND ACCESSORIES**

1. ALL DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO THESE GENERAL NOTES AND ACCOMPANYING DRAWINGS AND SPECIFICATIONS.



2. MATERIALS:

- A. STEEL WIRE ROPE: GALVANIZED 7x19 IWRC OR STRAND CORE, FED. SPEC. RR-W-410. SIZE AS INDICATED ON STRUCTURAL DRAWINGS.
  - B. SHACKLES: GALVANIZED STEEL, ASTM A153.
  - C. WIRE ROPE CLIPS: CROSBY FORGED STEEL WIRE ROPE CLIPS (OR EQUAL), FED. SPEC. C-450, TYPE 1, CLASS 1.
  - D. THIMBLES: GALVANIZED STEEL, FED. SPEC. FF-T-276b.
  - E. TURNBUCKLES: FORGED GALVANIZED STEEL, ASTM F-1145-05, ASTM A668 CLASS A MATERIAL OR EQUAL.
3. ALL WIRE ROPE COMPONENTS SHALL BE INSTALLED ACCORDING TO MANUFACTURERS RECOMMENDATIONS. INSPECT ALL MATERIALS PRIOR TO USE; REMOVE ANY DAMAGED, CRACKED OR ABRADED MATERIALS FROM SERVICE.

**HIGH WIND-LOAD ACTION PLAN (HWAP) REQUIREMENTS**

This section is based on the ANSI Standard "E1.21, Temporary structures used for technical production of outdoor entertainment events".

1. THE HWAP DEFINES WIND DESIGN SPEEDS FOR AN "OPEN MAIN STAGE ROOF SYSTEM" AND A "FULLY ENCLOSED MAIN STAGE ROOF SYSTEM".
  - A. AN "OPEN MAIN STAGE ROOF SYSTEM" SHALL BE DEFINED BY A CONDITION WHERE THE MAIN STAGE ROOF STRUCTURE IS FULLY ERECTED WITH NO WALL PANELS OR STAGE EQUIPMENT INSTALLED ON THE ROOF STRUCTURE.
  - B. A "FULLY ENCLOSED MAIN STAGE ROOF SYSTEM" SHALL BE DEFINED BY A CONDITION WHERE THE MAIN STAGE ROOF STRUCTURE IS FULLY ERECTED WITH SIDESTAGE OR BACKSTAGE WALL PANELS OR STAGE EQUIPMENT INSTALLED ON THE ROOF STRUCTURE.
  - C. WIND DESIGN SPEEDS FOR THE "OPEN" CONDITION AND THE "FULLY ENCLOSED" CONDITION ARE DEFINED IN THE "LOADS" SECTION, ABOVE.
2. THE PURPOSE OF THE HWAP IS TO ENSURE THAT ALL STRUCTURES IN THE STAGE AREA WILL REMAIN SAFE DURING ALL WIND CONDITIONS.
  - A. THE HWAP PROVIDES A MEANS OF SAFELY RESPONDING TO INCREASING WIND LOAD DURING PERIODS OF VENUE OPERATION.
  - B. THE HWAP IS ONLY INTENDED TO PROVIDE A METHOD FOR REDUCING THE PROJECTED WIND AREA ON THE PERFORMANCE STAGE MAIN ROOF ONLY.
  - C. THE HWAP PERTAINS TO REMOVAL OF MAIN ROOF SIDE WALLS AND BACK WALLS ONLY.



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- D. THE HWAP SHALL BE IN FORCE AT ANY TIME WHEN THE MAIN STAGE ROOF SYSTEM FABRIC SIDEWALLS AND BACK WALLS ARE INSTALLED.
- E. THE HWAP IS NOT REQUIRED WHEN THE MAIN STAGE ROOF SIDEWALLS AND BACKWALLS ARE NOT INSTALLED.
- 3. THE FOLLOWING PROVISIONS MUST BE MET PRIOR TO IMPLEMENTATION OF THE HWAP;
  - A. THE FABRIC SIDEWALL AND BACKWALL INSTALLATION METHOD MUST ALLOW FOR THESE UNITS TO BE LOWERED IN A CONTROLLED FASHION IN LESS THAT 5 MINUTES FROM NOTICE OF PUTTING THE HWAP INTO ACTION.
  - B. SPECIFIC INSTALLATION DETAILS, INCLUDING FOR FABRIC SIDEWALLS AND BACKWALL, MUST BE APPROVED BY THE ENGINEER OF RECORD.
- 4. HWAP TRAINING:
  - A. THE VENUE OPERATOR SHALL PROVIDE FOR HWAP TRAINING OR ENSURE THAT THE TRAINING IS PROVIDED BY OTHERS.
  - B. TRAINING SPECIFICS:
    - 1. A DOCUMENTED RECORD OF TRAINING SHALL BE KEPT ON SITE AND IN THE VENUE OPERATORS GENERAL OFFICES.
    - 2. ALL HWAP TRAINED PERSONNEL SHALL BE RETRAINED AFTER A PERIOD OF 3 YEARS OR AFTER THEY HAVE NOT WORKED AT THE VENUE FOR A PERIOD OF 1 YEAR.
    - 3. A MOBILIZATION MEETING SHALL TAKE PLACE AT THE BEGINNING OF EACH EVENT TO DEFINE SPECIFIC RESPONSIBILITIES FOR ONSITE HWAP PERSONNEL.
    - 4. AN HWAP CREW MANAGER SHALL BE DESIGNATED DURING THE MOBILIZATION MEETING.
    - 5. THE HWAP CREW MANAGER SHALL HAVE AUTHORITY TO IMPLEMENT THE HWAP AT ANY TIME AND UNDER ANY CIRCUMSTANCES HE/SHE SEES FIT.
- 5. HIGH WIND ACTION PLAN:
  - A. THE HWAP SHALL BE IN FORCE WHEN ANY OF THE FOLLOWING CONDITIONS OCCUR:
    - 1. FABRIC SIDEWALLS AND/OR BACKWALLS ARE INSTALLED ON THE MAIN STAGE ROOF SYSTEM.
    - 2. THE VENUE IS BEING USED FOR AN EVENT.
      - a. AN EVENT SHALL BE DEFINED AS ANY CONCERT, REHEARSAL, RENTAL OR ANY OTHER PROFESSIONAL OR COMMERCIAL USE OF THE STAGE SPACE BY ANY PARTY THAT IN ANY WAY REQUIRES USE OF STAGING EQUIPMENT TO BE ATTACHED TO THE MAIN STAGE ROOF STRUCTURE.



- a. AN EVENT SHALL BE DEFINED AS ANY CONCERT, REHEARSAL, RENTAL OR ANY OTHER PROFESSIONAL OR COMMERCIAL USE OF THE STAGE SPACE BY ANY PARTY THAT IN ANY WAY REQUIRES USE OF STAGING EQUIPMENT TO BE ATTACHED TO THE MAIN STAGE ROOF STRUCTURE.
- b. EXCEPTION:
  - (1) ANY EXCEPTION SHALL BE ALLOWED IF THE EQUIPMENT INSTALLED ON THE MAIN ROOF UNIT PRESENTS A PROJECTED WIND AREA OF LESS THAN 2% OF THE BARE ROOF AREA AND
  - (2) NO SIDEWALLS OR BACKWALLS OF ANY KIND ARE INSTALLED ON THE MAIN STAGE ROOF SYSTEM.
- B. THE HWAP SHALL GOVERN OPERATING CONDITIONS DURING A TIME PERIOD THAT SHALL COMMENCE AT THE BEGINNING OF PRE-EVENT OPERATIONS AND SHALL CONTINUE TO SUCH TIME WHEN ALL PERSONNEL AND EQUIPMENT HAVE BEEN REMOVED FROM THE VENUE AT THE CLOSE OF THE SPECIFIC EVENT.
- C. MONITORING OF SITE WIND CONDITIONS: ACTIVE ON SITE WIND MONITORING SHALL BE MAINTAINED FOR THE DURATION OF THE MAIN STAGE ROOF SYSTEM ERECTION UNLESS THE WALL PANELS ARE LOWERED TO REDUCE WIND PRESSURE.
  - 1. WIND SPEED MONITORING (ANEMOMETERS): ACTIVE ON-SITE WIND MONITORING SHALL CONSIST OF ANEMOMETERS ERECTED AT AN ELEVATION WITHIN 5' +/- OF THE HIGHEST COMPONENT OF THE MAIN STAGE ROOF SYSTEM. THE ANEMOMETER SHALL NOT BE LOCATED ON THE ROOF SYSTEM OR ITEMS WITHIN THE STAGE BLOCK (THE ONSTAGE AND BACKSTAGE AREAS). THE ANEMOMETER SHALL BE INSTALLED AT A HORIZONTAL DISTANCE OF BETWEEN 50' AND 250' AWAY FROM THE BASE OF THE ROOF SYSTEM.
  - 2. LOCAL WEATHER SERVICE MONITORING: REAL-TIME MONITORING OF A LOCAL LINK TO THE NATIONAL WEATHER SERVICE (THIS MAY BE A LINK TO A LOCAL COMMERCIAL OR GOVERNMENT SERVICE) SHALL BE MAINTAINED BY THE HWAP CREW.
  - 3. ACCESS DURING MONITORING: ACCESS IN THE VICINITY OF THE ROOF STRUCTURE SHALL ONLY BE ALLOWED WHILE MONITORING IS MAINTAINED.
- D. THE FOLLOWING HIGH-WIND ACTION PLAN MUST BE POSTED IN A CONSPICUOUS AREA ON SITE. IT MUST BE PROTECTED FROM THE WEATHER AND AVAILABLE AT ALL TIMES TO VENUE OPERATORS AND CREW AND ANY AUTHORITY HAVING JURISDICTION RELATING TO THESE MATTERS.



1. WHEN WIND GUSTS EXCEED 30 MPH: MOBILIZE THE HWAP CREW AND HAVE THE NECESSARY PERSONNEL IN PLACE AND ON STANDBY.
2. WHEN WIND GUSTS EXCEED 35 MPH: REMOVE THE WIND WALLS.
3. WHEN WIND GUSTS EXCEED 40 MPH: ALL WIND WALLS MUST BE FULLY LOWERED AND SECURED AT GROUND LEVEL. IF WIND WALLS HAVE NOT BEEN REMOVED WHEN WIND SPEED EXCEEDS 40 MPH, ALL PERSONNEL SHOULD MAINTAIN A SAFE CLEAR DISTANCE FROM THE ROOF SYSTEM AS COLLAPSE OF THE ROOF MAY OCCUR.
4. ONCE WALL PANELS HAVE BEEN REMOVED FROM THE ROOF SYSTEM, THE STAGE STRUCTURE IS SAFE FOR THE FULL DESIGN WIND SPEED WITH REDUCTION FACTOR.
5. DO NOT LOWER ROOF SYSTEM DURING CONDITIONS OF HIGH WIND.