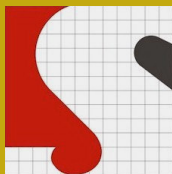


October 2004

## Recent Projects:

- ESPN/Brown United Big Air Ramp for XGames Los Angeles, CA
- Griffith Observatory Planetarium Lift Los Angeles, CA
- Boston Opera Stage Rigging System Boston, MA
- Norwegian Cruise Lines Theatre and Rigging Inspections
- Cincinnati Mills Mall Custom Signage Cincinnati, OH
- Bette Midler Tour Ground-Supported Concert Rigging Atlantic City, NJ

**Entertainment Structures Group**  
A Division of Steven Schaefer Associates, Inc.  
10411 Medallion Drive Suite 121  
Cincinnati OH 45241  
(800) 542-3302  
[www.entertainmentstructures.com](http://www.entertainmentstructures.com)



© Steven Schaefer Associates Inc.

## HANDRAILS—Know what's required.

*Just because your structure is temporary doesn't mean it won't need to meet code.*

“That’s exactly what many people think” says Shawn Nolan, division coordinator of the Entertainment Structures Group “and it can be a dangerous assumption.” The strength of safety railings is always defined by building codes or set by regulatory agencies such as OSHA – no matter whether your structure is temporary or permanent. And unfortunately, many commercial railing systems that are available for temporary use with stairways, scaffolds and mezzanines are not strong enough to meet code requirements for public access.

For example, International Building Code states that handrails must be designed to resist a load of 50 lbs per lineal foot, applied in any direction at the top rail<sup>1</sup>. They must also be checked for a 200 lb point load – at any point and in any direction along the top rail<sup>2</sup>. Even intermediate assemblies such as spindles or chain link fencing must be able to resist a lateral load of 50 lbs acting on any one square foot area<sup>3</sup>. Although not necessarily applicable to industrial or commercial spaces, these specifications are required for any areas of public occupancy. For some occu-

pancies, such as industrial work places, the required loading acting on the handrail can be as low as 20 lbs per lineal foot<sup>4</sup>. Any handrail assembly must be able to safely transfer this load through supports to the structure.

Mr. Nolan cautions to “be sure that your handrails meet both strength *and* size requirements for your appropriate building code.” Note that code requires handrails be a minimum of 34” to a maximum of 38” from the walking surface<sup>5</sup> and guardrails need to be a minimum of 42” high<sup>6</sup>. If steps are involved, the allowable height is measured at the leading edge of the stair tread. In addition, guardrail systems in public access areas cannot allow anything larger than a 4” diameter sphere to pass through the system up to a height of 34”. Also, some codes state that guards cannot be climbable (which generally excludes any kind of horizontal framing).

Whether you are building a temporary or permanent structure, the design needs to accommodate all the requirements for



**Understand which building codes apply to your temporary or permanent structure.**

*Article continues on back page.*

## Welcome to the first edition of the ESG Report

This bi-monthly publication will address current trends, issues, and news regarding structural engineering for the entertainment industry. Look forward to case studies, interviews, and project highlights in future issues.

This report can be emailed to you directly and will also be available on our web site. If you would like to receive the ESG Report via email, please contact Elizabeth Baron at [eab@entertainmentstructures.com](mailto:eab@entertainmentstructures.com).





ESG worked with Brown United on ESPN's new, very popular Big Air Ramp. The ramp was the centerpiece of the recent XGames in Los Angeles.



ESG was formed to address the growing need for structural engineering in the entertainment industry.

As the entertainment industry grows there is an increasing need to address building code requirements, to ensure that structures are adequately strong & safe, and to address the realities of liability issues in today's society.

## HANDRAILS continued.

handrails and guardrails. The material you use can affect complying with code — realize that wood, a cost efficient option for temporary construction, might not be able to meet all building code requirements for strength and deflection. Know up front what, if any, limitations you might encounter when choosing a handrail material.

There are some differences between the various codes for handrails and guardrails, but in general the codes have similar requirements. Be sure to check which codes apply to your project, whether they are building code requirements, OSHA regulations, or any other applicable code. Remember that railings are an excellent form of fall protection – but not until they are properly designed and installed.



## Footnotes:

- 1 International Building Code, 2003 1607.7.1
- 2 International Building Code, 2003 1607.7.1.1
- 3 International Building Code, 2003 1607.7.1.2
- 4 International Building Code, 2003 1607.7.1 (exceptions #2)
- 5 International Building Code, 2003 1009.11.1
- 6 International Building Code, 2003 1012.2



ESG is working with Paramount Kings Island on the new thriller ride The Italian Job (to open in 2005) — with foundation design, station design, and theme/scene elements.

