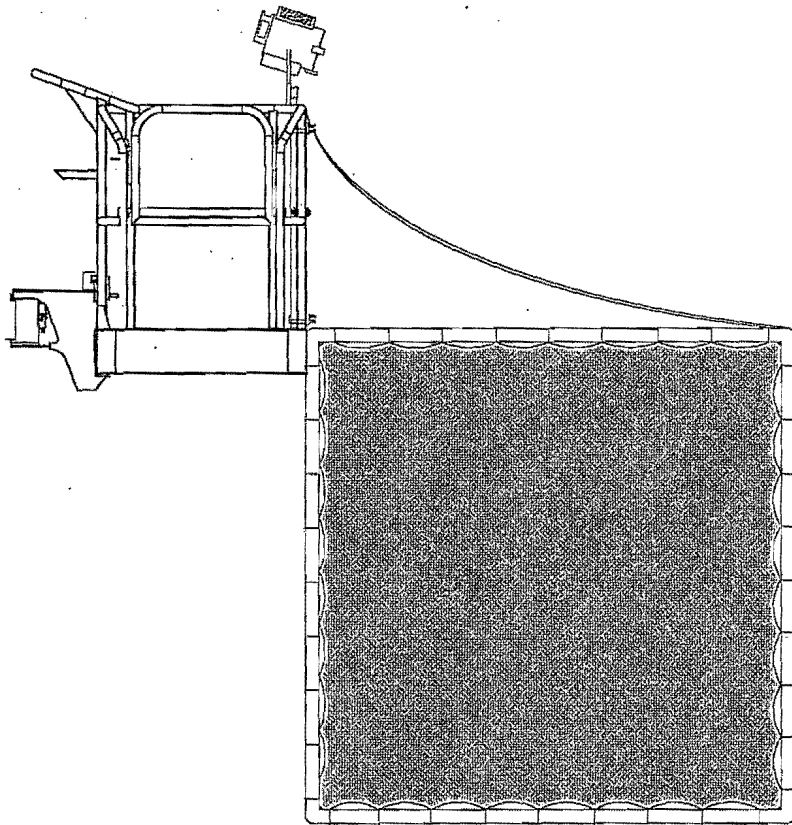


# ***Boom Lift Platform Capacity Reduction Manual***



***For Set Lighting Technicians  
and Studio Grips***

# **DANGER**

**The aerial platform is not electrically insulated. Death or serious injury will result from contact with, or inadequate clearance from, an energized conductor.**

**Do not go closer than the minimum safe approach distance as defined by the Minimum Safe Approach Distance section in Chapter 2–Safety.**

Regard all conductors as energized.

Allow for electrical wire sag and aerial platform sway.

If the platform, booms, or any part of the aerial platform contacts a high-voltage electrical conductor, the entire machine can become electrically charged.

If that happens, remain on the machine and do not contact any other structure or object. This includes the ground, adjacent buildings, poles, and any other objects that are not part of the aerial platform.

Such contact could make your body a conductor to the other object, creating an electrical shock hazard resulting in death or serious injury.

If an aerial platform is in contact with an energized conductor the platform operator must warn ground personnel in the vicinity to stay away. Their bodies can conduct electricity creating an electrical shock hazard resulting in death or serious injury.

Do not approach or leave the aerial platform until the electricity has been turned off.

Do not attempt to operate the lower controls when the platform, booms, or any part of the aerial platform is in contact with a high-voltage electrical conductor or if there is an immediate danger of such contact.

Personnel on or near an aerial platform must be continuously aware of electrical hazards, recognizing that death or serious injury can result from contact with an energized conductor.

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# Chapter 1 – Introduction

## Safety Alerts

A safety alert symbol is used throughout this manual to indicate danger, warning, and caution instructions. Follow these instructions to reduce the likelihood of personal injury and property damage. The terms danger, warning, and caution indicate varying degrees of personal injury or property damage that can result if the instruction is not followed.

### **Danger**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be used in the most extreme situations.

### **Warning**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

### **Caution**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

#### Notes

Notes are used to provide special information or helpful hints to assist in aerial platform operation, but do not indicate a hazardous situation.

## Platform Capacity Reduction Manual

### **Warning**

The potential for an accident increases when the aerial platform is operated by personnel who are not trained and authorized. Death or serious injury could result from such accidents. Read and understand the information in this manual, the approved machine specific Operator's Manual, and the placards and decals on the machine before operating the aerial platform on the job.

This manual provides Set Lighting Technicians and Studio Grips information for safe and proper operation for the use of movie production equipment on the aerial platform. Read and understand the information in this manual, the approved machine specific Operator's Manual, and the placards and decals on the machine before operating the aerial platform on the job. This manual must be kept in the manual holder on the machine at all times.

- Trained operators must complete a specific training course that complies with the requirements of this manual. All other operators must follow the requirements of the approved machine specific Operator's Manual only.
- Instructions, warnings, and safety guidelines in this manual, as well as the approved machine specific

Operator's Manual must be followed for the modification of the aerial platform through the attachment of movie production equipment as well as all associated hardware to the platform rails.

This Platform Capacity Reduction Manual is for the following approved Snorkel machine models:

- TB37
- TB42
- TB42J
- TB50
- TB60
- TB66J
- TB80
- TB80FA
- TB85J
- TB85JFA
- TB100J
- TB120
- TB126J
- AB46JRT
- AB46JE
- AB50J
- AB60J
- AB80J
- AB85RJ

Additional copies of this manual may be ordered from Snorkel. Supply the part number from the front cover to assure that the correct manual will be supplied.

All information in this manual is based on the latest product information at the time of publication. Snorkel reserves the right to make product changes at any time without obligation.

## Operation

The aerial platform has built-in safety features and has been factory tested for compliance with Snorkel specifications and industry standards. However, any personnel lifting aerial platform can be potentially dangerous in the hands of untrained or careless operators.

### **Warning**

The potential for an accident increases when the aerial platform is operated by personnel who are not trained and authorized. Death or serious injury could result from such accidents. Read and understand the information in this manual, the approved machine specific Operator's Manual, and the placards and decals on the machine before operating the aerial platform on the job.

Training is essential and must be performed by a qualified person.

- Become proficient in knowledge and actual operation before using the aerial platform on the job.
- The operator must be familiar with the instructions and warnings in this manual as well as the approved machine specific Operator's Manual before using the aerial platform on the job.
- The operator must be trained and authorized to perform any functions of the aerial platform.
- Operation of the aerial platform must be within the scope of the machine specifications.

The operator bears ultimate responsibility for following all manufacturer's instructions and warnings, regulations and safety rules of their employer and/or any state or federal law.

### **Manual of Responsibilities**

All owners and users of the aerial platform must read, understand, and comply with all applicable regulations. Ultimate compliance to OSHA regulations is the responsibility of the user and their employer.

ANSI publications clearly identify the responsibilities of all personnel who may be involved with the aerial platform. A reprint of the "Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors and Lessees of ANSI/SIA A92.5-2006 Boom-Supported Elevating Work Platforms" is available from Snorkel dealers or from the factory upon request.

Copies are also available from:

Scaffold Industry Association, Inc.  
P. O. Box 20574  
Phoenix, AZ 85036-0574 USA

### **Additional Information**

For additional information contact your local dealer or Snorkel at:

Snorkel International  
P.O. Box 1160  
St. Joseph, MO 64502-1160 USA  
1-800-255-0317

<http://www.snorkelusa.com>

## Chapter 2 – Safety

Knowledge of the information in this manual, the approved machine specific Operator's Manual and proper training, provide a basis for safely operating the aerial platform. Know the location of all controls and how they operate to act quickly and responsibly in an emergency.

Safety devices reduce the likelihood of an accident.

- Never disable, modify, or ignore any safety device.
- Safety alerts in this manual indicate situations where accidents may occur.

If any malfunction, hazard or potentially unsafe condition relating to capacity, intended use, or safe operation is suspected, stop aerial platform operation and seek assistance.

### **Warning**

The potential for an accident increases when the aerial platform is operated by personnel who are not trained and authorized. Death or serious injury could result from such accidents. Read and understand the information in this manual, the approved machine specific Operator's Manual, and the placards and decals on the machine before operating the aerial platform on the job.

The operator bears ultimate responsibility for following all manufacturer's instructions and warnings, regulations and safety rules of their employer and/or any state or federal law.

### Electrocution Hazards

The aerial platform is made of metal components and is not insulated. Regard all conductors as energized. Do not operate outside during a thunderstorm.

### Minimum Safe Approach Distance

Minimum safe approach distances to energized power lines and their associated parts must be observed while operating the aerial platform.

### **Danger**

The aerial platform is not electrically insulated. Death or serious injury will result from contact with, or inadequate clearance from, an energized conductor. Do not go closer than the minimum safe approach distance as defined by ANSI.

ANSI publications define minimum distances that must be observed when working near bus bars and energized power lines. Table 1 and Figure 3 are reprinted courtesy of Scaffold Industry Association, ANSI/SIA A92.5.

Voltage Range (Phase to Phase)	Minimum Safe Approach Distance	
	Feet	Meters
0 to 300V	Avoid Contact	
Over 300V to 50kV	10	3.05
Over 50kV to 200kV	15	4.60
Over 200kV to 350Kv	20	6.10
Over 350kV to 500kV	25	7.62
Over 500kV to 750kV	35	10.67
Over 750kV to 1000kV	45	13.72

Table 1 – Minimum Safe Approach Distance

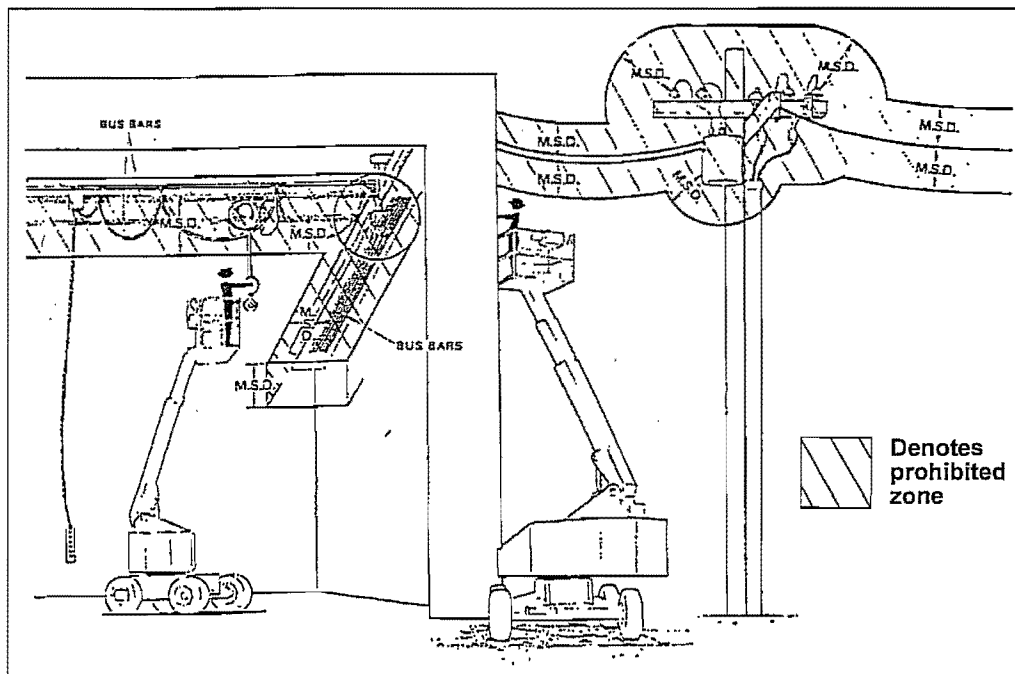


Figure 3 – Minimum Safe Approach Distance

## Attaching Movie Production Equipment

### **⚠️ Danger**

The aerial platform can tip over if it becomes unstable. Death or serious injury will result from a tip-over accident. Do not exceed the maximum platform capacity while operating the aerial platform.

### **⚠️ Warning**

This manual is solely for the use by Set Lighting Technicians and Studio Grips. The potential for an accident increases when the aerial platform is operated by personnel who are not trained and authorized. Death or serious injury could result from such accidents. Read and understand the information in this manual, the approved machine specific Operator's Manual, and the placards and decals on the machine before operating the aerial platform on the job.

In addition to the instructions, warnings, and safety guidelines outlined in the approved machine specific Operator's Manual:

- The operator must be familiar with the instructions, warnings, and safety guidelines in this manual, as well as the approved machine specific Operator's Manual.
- Operate the aerial platform only on a firm, flat, level surface capable of withstanding all load forces imposed by the aerial platform in all operating conditions. Refer to the approved machine specific Operator's Manual for the maximum wheel load and ground pressure.
- The total weight of movie production equipment, associated hardware, power supply cables, occupants, tools, and all other necessary equipment must remain less than the platform rated work load. Refer to Chapter 3 to determine the allowable platform capacity.
- Do not modify the guardrails by drilling, welding, crushing, damaging or any other modifications.
- Do not block the entrance to the platform, foot switch, upper controls, lanyard anchorage points, manual holder, placards and decals.
- Do not restrict the movement of the aerial platform, endanger the operator, or people on the ground when attaching power supply cables to the boom.
- Do not hang cables over platform rails without attaching them to the end of each boom section to prevent the cables from being damaged.
- Attach movie production equipment, power supply cables and all other necessary mounting hardware

and equipment, in a way that does not cause a tip-over hazard due to a side or vertical force that could result in the machine becoming unstable.

- Do not attach movie production equipment to the platform guardrail that could cause or impose a side or vertical load from wind or contact with adjacent objects.

### Maximum Wind Speed

### **⚠️ Danger**

The aerial platform can tip over if it becomes unstable. Death or serious injury will result from a tip-over accident. Do not exceed the maximum wind speed when operating the aerial platform.

When operating the aerial platform in windy conditions, the total surface area of the movie production equipment attached to the platform must be limited by the maximum allowable wind speed. Refer to Figure 2.1 to determine the maximum allowable wind speed.

For the TB100J, TB120, and TB126J machines the maximum platform height needs to be limited to 85 feet, or the total surface area of the movie production equipment attached to the platform needs to be limited to 8' x 8' (64 sq. ft.).

Total Surface Area of Movie Production Equipment Attached to Platform	Maximum Allowable Wind Speed
4' x 4' (16 sq. ft.)	24 mph
6' x 6' (36 sq. ft.)	22 mph
8' x 8' (64 sq. ft.)	19 mph
12' x 12' (144 sq. ft.)	15 mph
20' x 20' (400 sq. ft.)	10 mph

Figure 2.1 – Maximum Wind Speed

## Chapter 3 – Platform Capacity Reduction

### Platform Capacity

The platform rated work load can be found in the approved machine specific Operator's Manual.

### **⚠ Danger**

The aerial platform can tip over if it becomes unstable. Death or serious injury will result from a tip-over accident. Do not exceed the maximum platform capacity while operating the aerial platform.

The total weight of movie production equipment, associated hardware, power supply cables, occupants, tools, and all other necessary equipment must remain less than the maximum platform capacity.

The platform capacity is based on evenly distributed load in the platform. The farther the movie production equipment is mounted from the center of the platform, the greater the platform capacity is reduced.

### Calculating Platform Capacity

Use the following to determine the reduced platform capacity:

1. Weigh the total suspended power supply cables attached to the boom and necessary rigging hardware.
2. Weigh the movie production equipment and necessary hardware mounted to the platform in pounds.
3. Locate the center of gravity point of the movie production equipment mounted to the platform.
4. Measure the distance from the equipment center of gravity, as determined in Step 3, to the back toeboard of the platform in inches. Refer to Figure 3.1.

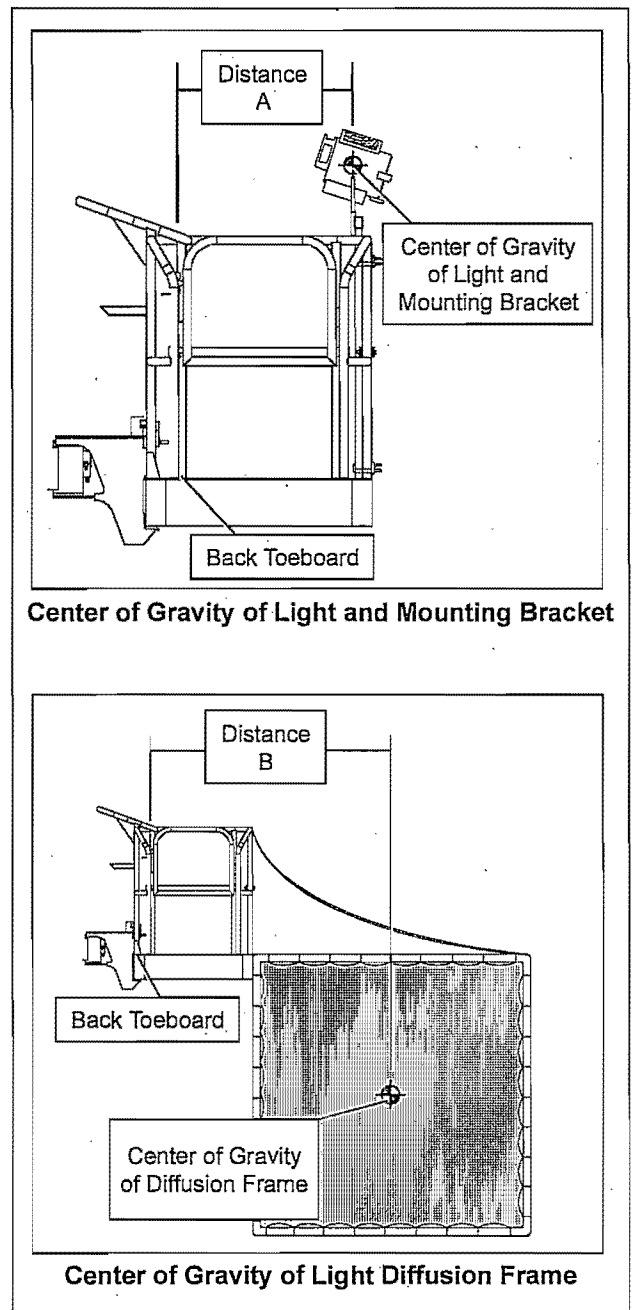


Figure 3.1 – Measuring the Equipment Center of Gravity

5. Use Figure 3.2 to determine the equipment load on the platform.
  - Using the chart, locate the weight of added equipment (from Step 2), rounding up to the next number if necessary.
  - Using the chart, locate the equipment center of gravity (from Step 4), rounding up to the next number if necessary.

## Chapter 4 – Platform Capacity Reduction

- From these numbers, use the chart to determine the equipment load of the movie production equipment.
6. Add the total suspended weight (from Step 1) and the equipment load calculated from the chart in Step 5.
  7. To determine the remaining platform capacity, subtract the calculation in Step 6 from the platform rated work of the machine.
4. The weight of the equipment calculated in Step 2 must be rounded up to 100 pounds, the next highest figure on the chart. The equipment center of gravity calculated in Step 4 must be rounded up to 36 inches. Using these figures on the chart, the equipment load is 150 pounds.
  5. The weight of the suspended cables and hardware plus the equipment load is 160 lbs (10 lbs + 150 lbs = 160 lbs). The platform capacity of the machine is 500 lbs. The remaining platform capacity is 340 lbs (500 lbs - 160 lbs = 340 lbs).

### Example

1. The total weight of the power supply cables attached to the boom and necessary rigging hardware is 10 pounds.
2. The total weight of the lighting equipment and mounting hardware attached to the front of the platform is 94 pounds.
3. The center of gravity is located 35 inches from the back toeboard (Distance A in Figure 3.1).

Weight of Added Equipment <sup>1</sup> (lbs)	Equipment Center of Gravity <sup>2</sup> (inches) (Distance A or Distance B in Figure 3.1)											
	30	36	48	60	72	84	96	108	120	132	144	156
	Equipment Load (lbs)											
50	67	75	92	108	125	141	158	175	191	208	224	241
75	100	112	137	162	187	212	237	262	287	312	337	362
100	133	150	183	216	249	283	316	349	382	416	449	482
125	167	187	229	270	312	353	395	436	478	519	561	603
150	200	225	275	324	374	424	474	524	574	623	673	723
175	233	262	320	378	437	495	553	611	669	727	785	
200	266	300	366	433	499	565	632	698	765			
225	300	337	412	487	561	636	711	786				
250	333	375	458	541	624	707	790					
275	366	412	503	595	686	777						
300	400	449	549	649	748							
325	433	487	595	703								
350	466	524	641	757								
375	500	562	686									
400	433	599	732									
425	566	637	778									
450	599	674										
475	633	712										
500	666	749										
525	699	787										
550	733											
575	766											
600	799											

Note 1: When weighing the equipment added to the platform, always round up to the next number found on the chart.

Note 2: When measuring the distance from the back toeboard, always round up to the next number found on the chart.

**Figure 3.2 – Platform Capacity Reduction Chart**

## Appendix A – Glossary

**aerial platform** – a mobile device that has an adjustable position platform, supported from ground level by a structure.

**boom** – a movable cantilever beam which supports the platform.

**center of gravity** – the point at which the entire weight of an object is evenly balanced.

**floor or ground pressure** – the maximum pressure, expressed in pounds per square inch, a single wheel concentrates on the floor or ground.

**guardrail system** – a vertical barrier around the platform to prevent personnel from falling.

**lower controls** – the controls located at ground level for operating some or all of the functions of the aerial platform.

**manufacturer** – a person or entity who makes, builds or produces an aerial platform.

**maximum travel height** – the maximum platform height or the most adverse configuration(s) with respect to stability in which travel is permitted by the manufacturer.

**maximum wheel load** – the load or weight that can be transmitted through a single wheel to the floor or ground.

**Minimum Safe Approach Distance (M.S.A.D.)** – the minimum safe distance that electrical conductors may be approached when using the aerial platform.

**movie production equipment** – the equipment such as light diffusion frames, set lighting, camera mounts etc. used for movie production.

**operation** – the performance of any aerial platform functions within the scope of its specifications and in accordance with the manufacturer's instructions, the users work rules, and all applicable governmental regulations.

**operator** – a qualified person who controls the movement of an aerial platform.

**platform** – the portion of an aerial platform intended to be occupied by personnel with their tools and materials.

**platform rated work load** – the total weight of the personnel and equipment that may be lifted in the platform.

**prestart inspection** – a required safety inspection routine that is performed daily before operating the aerial platform.

**qualified person** – a person, who by reason of knowledge, experience, or training is familiar with the operation to be performed and the hazards involved.

**rated work load** – the designed carrying capacity of the aerial platform as specified by the manufacturer.

**toeboard** – a barrier around the platform floor to prevent equipment on the platform from falling.

**upper controls** – the controls located on or beside the platform used for operating some or all of the functions of the aerial platform.

Name	Company	Representing	Voting status	Int. cat.	Yes	Yes with comments	No with reasons	Abstain
John (Javid) D. Butler	Integrated Theatre, Inc.	Integrated Theatre, Inc.	P	CP	X			
Stephen J. Kay	K-Tec Corporation	K-Tec Corporation	P	MP	X			
Ken Vannice	Colortran	Leviton Manufacturing Co., Inc.	P	MP	X			
Bill Grande	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	A	MP				
Bob Lüther	Lex Products Corp.	Lex Products Corp.	P	CP	X			
Kenneth M. Makowski	Lex Products Corp.	Lex Products Corp.	A	CP				
Tyrone Mellon Jr.	Lex Products Corp.	Lex Products Corp.	A	CP				
Louis Bradfield	Louis Bradfield	Louis Bradfield	I	U				
Jeff deRecat	Marinco/ADI	Marinco	P	MP				
William Drake	Marinco	Marinco	A	MP				
Michael J. Carnaby	Mikan Theatricals	Mikan Theatricals	P	DR	X			
W. G. Krokaugger, P. E.	Mole-Richardson Co.	Mole-Richardson Co.	P	CP	X			
Vincent J. Cannavale	Motion Laboratories	Motion Laboratories	P	CP				
Peter Herrmann	Motion Laboratories	Motion Laboratories	A	CP				
David Herrmann	Motion Laboratories	Motion Laboratories	A	CP				
Ron Bonner	PLASA	PLASA	P	U	X			
Michael Lay	Strand Lighting	Royal Philips Electronics	P	MP	X			
Michael Scudday	SSRC, Inc.	SSRC, Inc.	P	CP	X			
Stephen Vanciel	Stephen Vanciel	Stephen Vanciel	P	U	X			
Jerry Gorrell	Theatre Safety Programs	Theatre Safety Programs	P	U	X			
Richard Wolpert	Union Connector Company (MO)	Union Connector Company	P	CP				
Mitch Heffer	Entertainment Technology (Royal Philips Electronics)	USITT	P	U	X			
William L. Mairman	William L. Mairman	William L. Mairman	P	U	X			
		Total		27 possible	22	0	1	0
		Votes by interest category	7	CP	5	0	0	0
			6	MP	5	0	0	0
			2	DR	2	0	0	0
			10	U	7	0	1	0
			2	G	1	0	0	0

**Keith Woods's reasons:**

General comment: This document, while accurate in what is the protocol for the use of GFCI apparatus, does not accurately represent how the CEC deals with them.

3.1 the mention of NEC Article 518 and ANCE Article 518 is wrong for this document. Although, that is the section of those electrical codes dealing with Assembly occupancies, they in no way discuss GFCI units and their installation. I suggest that these articles be added as a FPN purely for reference to let the reader know where to look in the codes. The only reference to GFCI units should be to the Trinational standard that took effect Aug 1 of this year. The section should take the parantheses out and place them in a FPN as follows:

FPN: See trinational GFCI standard for useage and NEC/ANZE Articles 518 for implemetation.

3.2 see above. Section 44 tells the reader how to wire a theatre, it does not tell the reader what to do for GFCI units; CSA C22.2 NO 144.1-06 is what does that. The same hold true for Articles 530 in the US and Mexican codes. Again, the mention of Articles 530 and Section 44 should be purely as a FPN. A FPN similar to the one I have suggested above should be added.

3.3 see above.

The issue I have with this document, which has been gnawing at me for some time, is that the code references are red herrings. Yes, the articles and sections mentioned are the areas in the code that deal

with the aforementioned places of work, but there is absolutely no mention of the use of GFCI units in those sections. We should be sending the reader to the right documents to read, to get the job done safely and correctly. The Trinational Standard is what they need to know, the other documentation is the additional

In Canada, we do not go to Section 66 to learn of grounding and bonding, we go to Section 10. Section 66 is only one small part of what is needed to deal with cabling, distribution and GFCI distribution, and a small one at that. The document we use is the entirety of the CSA C22.1-06 at present, and then the updated versions that follow, not just Section 66, 44, or 48.

One cannot work with transformation and use only Section 66 as a guide, there is no mention of that in the section, the same holds true for GFCI work, the code is the resource not the section.

## Summary of Working Group Ballot to Accept BSR E1.19

**Ballot period:** 18 August through 15 September 2008

**Ballot document No.:** EP/2008-7014

**Working Group:** Electrical Power

**Referenced documents:**

Summary of BSR E1.19 Fourth Public Review Comments and Their Resolutions (document number EP/2008-7013)

BSR E1.19, Recommended Practice for the use of Class A Ground-Fault Circuit Interrupters (GFCIs) intended for personnel protection in the Entertainment Industry (document number EP/2001-7012r14)

**Statement:** At the 19 July 2008 Electrical Power Working Group meeting, a set of comment resolutions for the fourth public review was drafted and accepted by the working group. The resolutions made no changes to the draft BSR E1.19 standard. A motion was made and seconded to accept BSR E1.19 as an American National Standard.

**Question:** Do you accept the motion to accept BSR E1.19, Recommended Practice for the use of Class A Ground-Fault Circuit Interrupters (GFCIs) intended for personnel protection in the Entertainment Industry (document number EP/2001-7012r14), as an American National Standard? Comments and reasons offered with a vote will be recirculated to the working group and additional time will be allowed for voters to change their votes if they choose.

**Results:** Twenty-two out of a possible 27 voted Yes, and one voted No with reasons. Because of those reasons, voting members will have an additional 21 days to consider the reasons and their votes and to change their votes, if they wish.

Five ballots were not returned. No ballots were received from:

Wendy Holt; AMPTP; G

Roger Lattin, R. Bruce Prochal, Patric J. Abaravich, or Alan M. Rowe; I.A.T.S.E. Local 728; U

Louis Bradfield; U

Vincent J. Cannavale, Peter Herrmann, or David Herrmann; Motion Laboratories; CP

Richard Wolpert; Union Connector Company; CP

Name	Company	Representing	Voting status	Int. cat.	Yes	Yes with comments	No with reasons	Abstain
James Davey	AC Power Distribution Inc.	AC Power Distribution Inc.	P	CP	X			
Greg Mayberry	AC Power Distribution Inc.	AC Power Distribution Inc.	A	CP				
George Long	Aggreko Event Services	Aggreko	P	DR	X			
Wendy Holt	AMPTP	Alliance of Motion Picture and Television Producers	P	G				
Wolfgang Hofneinz	Bender GmbH & Co. KG	Bender GmbH & Co. KG	P	MP				
Joe Boardman	Bender Inc.	Bender GmbH & Co. KG	A	MP	X			
Paul Menetrey	Bender Inc.	Bender GmbH & Co. KG	A	MP				
Steve Terry	Electronic Theatre Controls	Electronic Theatre Controls, Inc.	P	MP	X			
Elizabeth E. (Lizz) Chancellor	Elizabeth Chancellor	Elizabeth Chancellor	I	U	X			
Ian Foulds	IATSE Local 873	Entertainment Electrical Safety Committee of Ontario	P	G	X			
Edwin S. Kramer	I.A.T.S.E. Local 1	I.A.T.S.E. Local 1	P	U	X			
Roger Lattin	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	P	U				
R. Bruce Prochal	IATSE Local 728	I.A.T.S.E. Local 728	A	U				
Patric J. Abaravich	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	A	U				
Alan M. Rowe	IATSE Local 728	I.A.T.S.E. Local 728	A	U				
Keith S. Woods	Lakhri Impressions Ltd.	IATSE Local 891	P	U			X	
Simon Hunt	IATSE Local 891	IATSE Local 891	A	U				