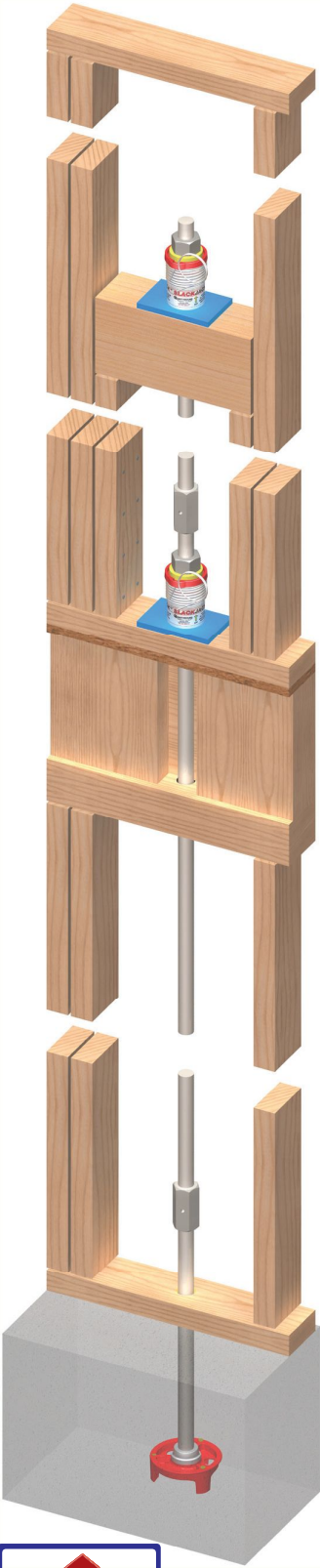


Continuous Threaded Rod Holddown System for Wood Shrinkage

tm



EB 4G				
WOOD FLOOR LEVEL	UPLIFT TENSION LOADS	CALCULATED DIFFERENTIAL LOADS	COLLECTED DIFFERENTIAL LOADS	WOOD COMPRESSION DOWNLOADS
5th	---	---	---	---
4th	8540	8540	8540	8540
3rd	12000	3460	3460	12000
2nd	18410	6410	6410	18410
1st	25060	6650	6650	25060

BRIDGE LEVEL	
Swivel Washer:	Gray
SlackJack:	A426 Green
Plate:	P10 Blue
Bridge Lumber:	4x6/6x6

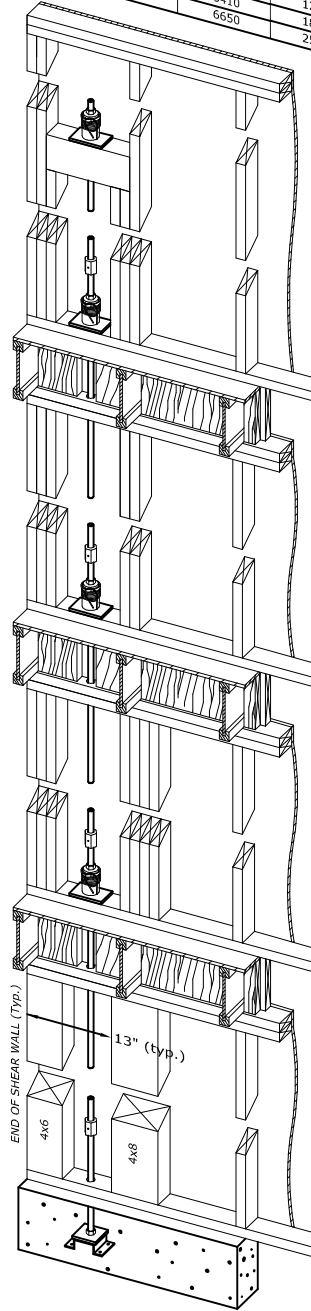
4th LEVEL	
Rod Size:	R6
Coupler:	C66
Swivel Washer:	Gray
SlackJack:	A426 Green
Plate:	P8 Black
Rod Size:	R6HS

3rd LEVEL	
Rod Size:	R6HS
Coupler:	C66HS
Swivel Washer:	Gray
SlackJack:	A416 Red
Plate:	P8 Black
Rod Size:	R6HS

2nd LEVEL	
Rod Size:	R6HS
Coupler:	C76HS
Swivel Washer:	Blue
SlackJack:	A417 Red
Plate:	P8 Black
Rod Size:	R7HS

1st LEVEL	
Rod Size:	R7HS
Coupler:	C77HS

ANCHOR PARTS	
Anchor Rod:	AB7HS
Nut:	N7HS
Plate:	AP3
Chair:	CHR15-17
Washer:	W7
Nut:	N7HS



BRIDGE BLOCK POSTING SCHEDULE	
<< 4 Inch Wall Condition	Two 2x4 + (HD Bay) + 2x4
6 Inch Wall Condition Below	2x6 + (HD Bay) + 2x6

Bridge Ht.: 6'-0"

POSTING SCHEDULE	
4 Inch Wall Conditions	Three 2x4 + (HD Bay) + Two 2x4
Two 3x4 + (HD Bay) + 3x4	
6 Inch Wall Condition Below	Two 2x6 + (HD Bay) + 2x6

Wall Ht.: 9'-0"

POSTING SCHEDULE	
4 Inch Wall Conditions	Four 2x4 + (HD Bay) + Three 2x4
Two 3x4 + (HD Bay) + Two 3x4	
6 Inch Wall Condition Below	Two 2x6 + (HD Bay) + Two 2x6

Wall Ht.: 9'-0"

POSTING SCHEDULE	
4 Inch Wall Conditions	4x6 + (HD Bay) + 4x8
Two 3x4 + (HD Bay) + Four 3x4	
6 Inch Wall Condition Below	Three 2x6 + (HD Bay) + Two 2x6

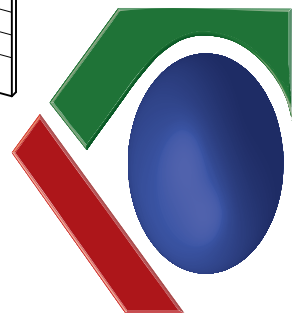
Wall Ht.: 9'-0"

EARTHBOUND



"Holdowns That Work"

May 2010 - U.S. National Edition



FEATURES AND BENEFITS OF THE EARTHBOUND SYSTEM®

Features:

- Standardized anchor bolt placement.
- Shrinkage and compression compensating Devices. See the SlackJack® and new MiniJack™ inside!
- 3-inch travel compensation available for six and seven story buildings.
- Color-coded components.
- Continuous connections.
- No welded parts.
- City of Los Angeles Research Report RR#25404.
- ICC-ES Evaluation Reports: ESR-2848, ES-5378
- U.S. Patents 6,161,350, 6,494,564, 6,688,058, 6,951,078, 7,159,366 and other U.S. & Foreign Patents Pending.



Benefits:

- Higher tolerance to anchor bolt misplacement.
- Holdowns that work after shrinkage and compression occur during the life of a building.
- Fewer devices required means material savings.
- Straight load path to foundation anchor.
- Color-coded plates and components provide straightforward identification and inspection.
- Only one vertical hole drilled per floor
- Installation labor savings.
- No ladder required.
- No eccentric loading.
- Proven corrosion resistance.



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ICC-ES Evaluation Report ESR-2848 12

Earthbound System Introduction

The Earthbound System is a patented continuous threaded rod system from a foundation anchor bolt set in the foundation to the uppermost floor of a building on both ends of a shear wall. Threaded rod couplers join the rods at each level.

The advantages of using a continuous threaded rod system in lieu of standard holddowns are higher uplift capacities, easier anchor bolt placement and no horizontal drilling which results in faster installations. The SlackJack® and MiniJack™ are shrinkage compensation devices that are placed at floor plate locations above the first floor and onto an Earthbound color coded bearing plate. Earthbound was the first to implement color coding and aluminum shrinkage devices into the system in which others are following. Steel SlackJacks are available for higher capacities.

The Earthbound System has two main locations for installing shrinkage compensation devices: at the selected floor levels and on a “compression bridge” at mid floor height, on the top floor of each rod run. The compression bridge is a horizontally placed sawn lumber 4x6 or 6x6. The use of the compression bridge will inherently save lumber and other material costs because the rod does not have to extend through the top roof joists. The compression bridge is supported by collector studs that are nailed to both adjacent full height members and shear panel edge nailed per the structural plan shear wall schedules.



COMPENSATION FOR SHRINKAGE AND BUILDING SETTLEMENT

The Earthbound System is proud to feature the SlackJack® and MiniJack™ shrinkage and building settlement compensation devices. These devices are revolutionary to the holddown industry and contains many features and benefits not found in other devices. Available with three inch compensation for six to seven stories.

**SLACKJACK®****MINIJACK™**

1" Travel SlackJack®

2" Travel SlackJack®

1" Travel MiniJack™

1.75" Travel MiniJack™

- The SlackJack® and MiniJack™ are fully evaluated under ICC-ESR 2848.
- Installs easier and faster than other take up devices.
- Salt spray tested to verify corrosion resistance and proven capability to continue to actuate.
- The SlackJack® features a patent-pending self-aligning swivel feature for rods out of plumb.
- Can be reset in the field without tools.
- No lag screws to buy separately and install.
- No set screw to forget to remove.
- No baling wire to remove or tie strap to cut.
- Clip is specially designed to not be left behind.
- Heavy duty compression spring to prevent rods from bowing.
- Color coded for threaded rod size and travel distance.
- SlackJacks are available up to 1 1/2" diameter rods (largest in industry!) in 1 inch thru 3 inch shrinkage compensation capacity.
- MiniJacks are available for 1/2" diameter rods in 1 and 1 3/4 inch travel.
- ICC-ES ESR-2848 and City of Los Angeles Research #25404

SLACKJACK® DEVICE INSTALLATION

SLIDE



1. Slide Slackjack® on top of color coded bearing plate.

SPIN



2. Place color coded washer and spin nut down hand tight.

PULL



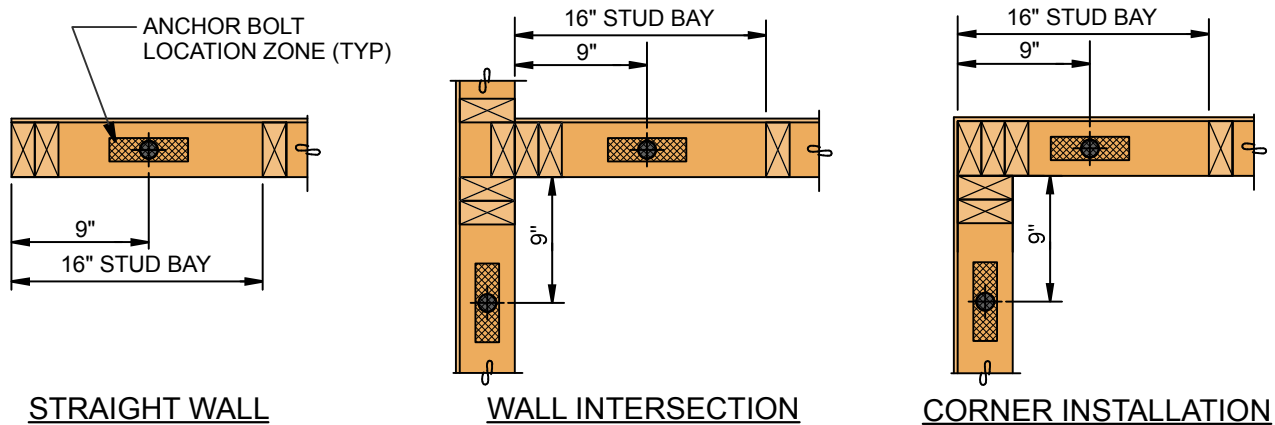
3. Pull clip away from device.

FINISHED!



4. All finished! It doesn't get any easier.

STANDARDIZED EARTHBOUND SYSTEM ANCHOR BOLT LAYOUT

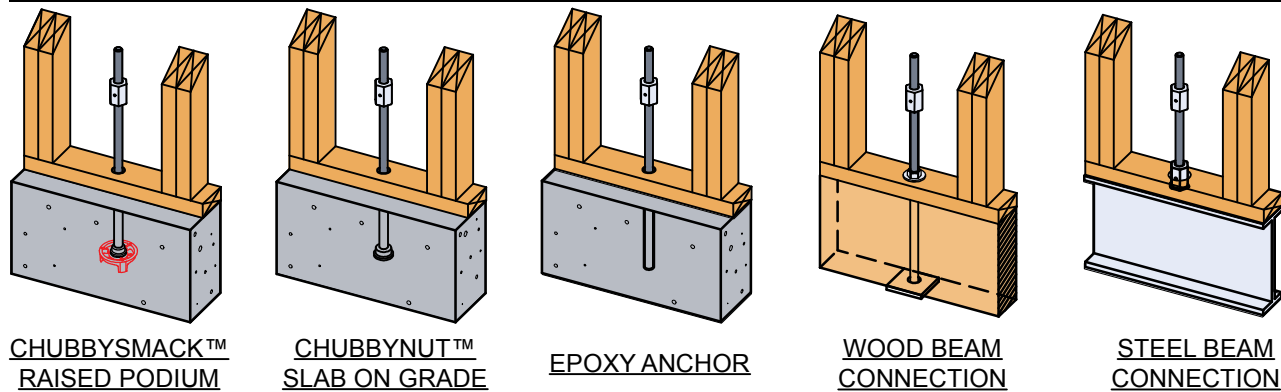


The Earthbound System features standardized anchor bolt placement.

What does this mean? - We want the anchor to be in the center of the first stud bay at each end of a shear wall. It means that no matter what compression members are required for the rod system holddown run, you can expect the anchor bolt location to remain nine (9") inches away from end of wall as shown above in all scenarios. It also means that your designed tension or overturning loads will not increase if anchor bolts are located further inward like other rod systems. A fixed layout dimension means easier anchor bolt layout before the pour.

How is the compression lumber distributed? - We want the additional compression lumber to occupy the first 16 inch on center stud bay, then start to fill in 2x studs inward away from end of wall. This maintains our maximum distance between anchor bolts in a shear wall and minimizes the calculated overturning load.

TYPICAL ANCHORING TYPES



Anchoring Notes: The holddown anchor design is by the design professional. Typically the anchor bolt diameter matches the first wood level threaded rod material specification and size. Earthbound can supply anchoring materials including standard embedded plate washers per drawing requirements needed to furnish a complete system package. The wood beam plate shown must be sized to handle the entire run load. For steel beam runs, we recommend field welding a standard coupler directly to the beam. Welding requirements is per the design professional. Contact Earthbound for dimensions and design information.

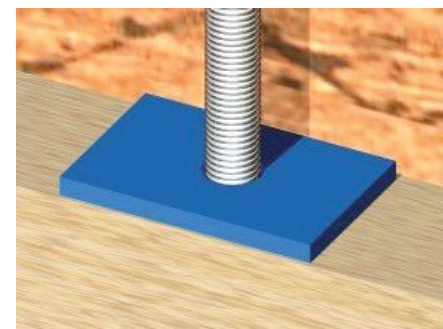
EARTHBOUND SYSTEM® COMPONENT SELECTION TABLES

EARTHBOUND THREADED ROD CAPACITIES								
ROD SIZE	ROD SIZE (in)	ROD AREA (in ²)	F'u (psi)	ALLOWABLE TENSION LOAD				ROD SPEC.
				(100)	(133)	(IBC 2006)	(0.125" MAX)	
R4	1/2"	0.1963	60,000	3,930 LBS	5,240 LBS	4,420 LBS	USE CODE VALUES	ASTM A36/A307
R5	5/8"	0.3068	60,000	6,140 LBS	8,180 LBS	6,900 LBS	USE CODE VALUES	ASTM A36/A307
R6	3/4"	0.4418	60,000	8,840 LBS	11,780 LBS	9,940 LBS	USE CODE VALUES	ASTM A36/A307
R7	7/8"	0.6013	60,000	12,030 LBS	16,040 LBS	13,530 LBS	USE CODE VALUES	ASTM A36/A307
R8	1"	0.7854	60,000	15,710 LBS	20,940 LBS	17,670 LBS	USE CODE VALUES	ASTM A36/A307
R9	1 1/8"	0.9940	60,000	19,880 LBS	26,500 LBS	22,370 LBS	USE CODE VALUES	ASTM A36/A307
R10	1 1/4"	1.2272	60,000	24,540 LBS	32,710 LBS	27,610 LBS	USE CODE VALUES	ASTM A36/A307
R12	1 1/2"	1.7671	60,000	35,340 LBS	47,110 LBS	39,760 LBS	USE CODE VALUES	ASTM A36/A307
R4HS*	1/2"	0.1963	125,000	8,180 LBS	10,900 LBS	9,200 LBS	5,930 LBS	ASTM A 193 B7
R5HS	5/8"	0.3068	125,000	12,780 LBS	17,040 LBS	14,380 LBS	9,270 LBS	ASTM A 193 B7
R6HS	3/4"	0.4418	125,000	18,410 LBS	24,540 LBS	20,710 LBS	13,350 LBS	ASTM A 193 B7
R7HS	7/8"	0.6013	125,000	25,060 LBS	33,400 LBS	28,190 LBS	18,160 LBS	ASTM A 193 B7
R8HS	1"	0.7854	125,000	32,720 LBS	43,620 LBS	36,820 LBS	23,730 LBS	ASTM A 193 B7
R9HS	1 1/8"	0.9940	125,000	41,420 LBS	55,210 LBS	46,590 LBS	30,030 LBS	ASTM A 193 B7
R10HS	1 1/4"	1.2272	125,000	51,130 LBS	68,160 LBS	57,520 LBS	37,070 LBS	ASTM A 193 B7
R12HS	1 1/2"	1.7671	125,000	73,630 LBS	98,150 LBS	82,830 LBS	53,380 LBS	ASTM A 193 B7

THREADED ROD NOTES:

- STANDARD STRENGTH ROD / ASTM A36: F'u = 60,000 PSI. "UNC" THREAD PITCH.
- HIGH STRENGTH ROD / ASTM A193B7: F'u = 125,000 PSI. "UNC" THREAD PITCH.
- TENSION LOADS ARE CALCULATED FROM THE FOLLOWING EQUATIONS:
 - (100) THREADED ROD CAPACITY = [(0.33 F'u * Nominal Rod Area)] PER AISC 9th EDITION (UBC97 thru IBC2003)
 - (133) COLUMN CONTAINS 1/3 SEISMIC DURATION INCREASE (100) LOADS ALLOWED UNDER UBC 97.
 - (IBC 2006) THREADED ROD CAPACITY = [(0.75/2 * F'u * Nominal Rod Area)] PER AISC 13th EDITION (IBC2006)
 - (0.125 MAX) THREADED ROD CAPACITY BASED ON 0.125 INCHES MAX ELONGATION BASED ON NOMINAL AREA, 10 FEET AND MoE=29E6.
- "UNC" = UNIFIED NATIONAL COARSE THREADED ROD PITCH.
- (*) = AVAILABLE BY SPECIAL ORDER, CHECK WITH EARTHBOUND FOR AVAILABILITY.

EARTHBOUND BEARING PLATE CAPACITIES					
PLATE PART NO.	DIFFERENTIAL LOAD	COLOR CODE	PLATE DIMENSIONS (INCHES)		
			WIDTH	LENGTH	THICK.
P4	4,000 LBS	ORANGE	3"	3"	1/4"
P8	8,000 LBS	BLACK	3-1/4"	5"	1/4"
P10	10,000 LBS	BLUE	3-1/4"	5"	3/8"
P12	12,000 LBS	GRAY	3-1/4"	6"	5/8"
P14	14,000 LBS	RED	3-1/4"	7"	3/4"
P16	16,000 LBS	TAN	3-1/2"	8"	3/4"
P18	18,000 LBS	YELLOW	3-1/2"	9"	1"
P20	20,000 LBS	GREEN	3-1/2"	10"	1"
P22	22,000 LBS	WHITE	3-1/2"	11"	1 1/4"
P24	24,000 LBS	GOLD	3-1/2"	11 1/2"	1 1/4"



Color coded P10 (Blue) shown.

BEARING PLATE NOTES:

- PLATE STEEL SHALL BE ASTM A36: F'u = 60,000 PSI.
- CUSTOM OR LARGER PLATE SIZES ARE AVAILABLE BY EARTHBOUND.
- BEARING AREA BASED ON DOUGLAS FIR LARCH AT F_{c(perp)} = 625 PSI.
- THE ENGINEER OF RECORD SHALL REVIEW AND APPROVE CAPACITIES.

SLACKJACK® COMPONENT SELECTION TABLE

How to use this table:

Select 1-inch SlackJack® travel for wood framing levels 1-3, 2-inch travel for levels 4-5. Levels 6-8: use 3 inch travel. Coordinate bearing plate required for differential load, then match up rod size to be used. Bearing plates, MiniJack™ and SlackJack® installation color codes are as shown. Design professional shall calculate and verify amount of shrinkage compensation required.

SLACKJACK 1" TRAVEL SELECTION MATRIX BY ROD & DIFFERENTIAL LOADS

DIFFERENTIAL LOAD	BEARING PLATE	ASTM A36/A307 THREADED ROD								DIFFERENTIAL LOAD
		R4	R5	R6	R7	R8	R9	R10	R12	
4,000 LBS	P4	MJ100 ¹	A215	A216	A217	A218	A219	A2110	S4112	4,000 LBS
8,000 LBS	P8	A414	A415	A416	A417	A418	A419	A4110	S4112	8,000 LBS
10,000 LBS	P10		A415	A416	A417	A418	A419	A4110	S4112	10,000 LBS
12,000 LBS	P12			A416	A417	A418	A419	A4110	S4112	12,000 LBS
14,000 LBS	P14				A417	A418	A419	A4110	S4112	14,000 LBS
16,000 LBS	P16					A618	A619	S4110	S4112	16,000 LBS
18,000 LBS	P18					A618	A619	S4110	S4112	18,000 LBS
20,000 LBS	P20						A619	S4110	S4112	20,000 LBS
22,000 LBS	P22						S419	S4110	S4112	22,000 LBS
24,000 LBS	P24							X4110	X4112	24,000 LBS
26,000 LBS	P26							X4110	X4112	26,000 LBS
28,000 LBS	P28							X4110	X4112	28,000 LBS
30,000 LBS	P30								X4112	30,000 LBS
32,000 LBS	P32								X4112	32,000 LBS
34,000 LBS	P34								X4112	34,000 LBS
36,000 LBS	P36								X4112	36,000 LBS

DIFFERENTIAL LOAD	BEARING PLATE	ASTM A193B7 HIGH STRENGTH (HS) THREADED ROD								DIFFERENTIAL LOAD
		R4HS	R5HS	R6HS	R7HS	R8HS	R9HS	R10HS	R12HS	
4,000 LBS	P4	MJ100 ¹	A215	A216	A217	A218	A219	A2110	S4112	4,000 LBS
8,000 LBS	P8	A414	A415	A416	A417	A418	A419	A4110	S4112	8,000 LBS
10,000 LBS	P10	A414	A415	A416	A417	A418	A419	A4110	S4112	10,000 LBS
12,000 LBS	P12		A415	A416	A417	A418	A419	A4110	S4112	12,000 LBS
14,000 LBS	P14		A415	A416	A417	A418	A419	A4110	S4112	14,000 LBS
16,000 LBS	P16			A616	A617	A618	A619	S4110	S4112	16,000 LBS
18,000 LBS	P18			A616	A617	A618	A619	S4110	S4112	18,000 LBS
20,000 LBS	P20			A616	A617	A618	A619	S4110	S4112	20,000 LBS
22,000 LBS	P22				S417	S418	S419	S4110	S4112	22,000 LBS
24,000 LBS	P24				X417	X418	X419	X4110	X4112	24,000 LBS
26,000 LBS	P26				X417	X418	X419	X4110	X4112	26,000 LBS
28,000 LBS	P28				X417	X418	X419	X4110	X4112	28,000 LBS
30,000 LBS	P30					X418	X419	X4110	X4112	30,000 LBS
32,000 LBS	P32					X418	X419	X4110	X4112	32,000 LBS
34,000 LBS	P34					X418	X419	X4110	X4112	34,000 LBS
36,000 LBS	P36					X418	X419	X4110	X4112	36,000 LBS

SLACKJACK 2" TRAVEL SELECTION MATRIX BY ROD & DIFFERENTIAL LOADS

DIFFERENTIAL LOAD	BEARING PLATE	THREADED ROD SIZE (A 36 OR A 193B7)								DIFFERENTIAL LOAD
		R4/R4HS	R5/R5HS	R6/R6HS	R7/R7HS	R8/R8HS	R9/R9HS	R10/R10HS	R12/R12HS	
4,000 LBS	P4	MJ175 ²	A225	A226	A227	A228	A229	A2210	S4212	4,000 LBS
8,000 LBS	P8	A424	A425	A426	A427	A428	A429	A4210	S4212	8,000 LBS
10,000 LBS	P10	A424	A425	A426	A427	A428	A429	A4210	S4212	10,000 LBS
12,000 LBS	P12			A426	A427	A428	A429	A4210	S4212	12,000 LBS
14,000 LBS	P14				A427	A428	A429	A4210	S4212	14,000 LBS
16,000 LBS	P16					A628	A629	S4210	S4212	16,000 LBS
18,000 LBS	P18					A628	A629	S4210	S4212	18,000 LBS
20,000 LBS	P20					A628	A629	S4210	S4212	20,000 LBS
22,000 LBS	P22						A629	S4210	S4212	22,000 LBS

SLACKJACK 3" TRAVEL SELECTION MATRIX BY ROD & DIFFERENTIAL LOADS

DIFFERENTIAL LOAD	BEARING PLATE	THREADED ROD SIZE (A36/A307 OR A193B7)								DIFFERENTIAL LOAD
		R4	R5	R6/R6HS	R7/R7HS	R8/R8HS	R9/R9HS	R10/R10HS	R12/R12HS	
4,000 LBS	P4	A434	A435	A436	A437	A438	A439	A4310		4,000 LBS
8,000 LBS	P8	A434	A435	A436	A437	A438	A439	A4310		8,000 LBS
10,000 LBS	P10		A435	A436	A437	A438	A439	A4310		10,000 LBS
12,000 LBS	P12			A436	A437	A438	A439	A4310		12,000 LBS
14,000 LBS	P14				A437	A438	A439	A4310		14,000 LBS

1. MINJACK™ MJ100 ALLOWABLE LOAD IS 3,500 LBS PER ESR-2848.
2. MINJACK™ MJ175 ALLOWABLE LOAD IS 3,500 LBS AND TRAVEL IS 1.75 INCHES PER ESR-2848.
3. THE COLOR OF THE ROD SIZE LABELS ABOVE MATCH SLACKJACK® SWIVEL WASHER COLOR CODE.



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COMPRESSION MEMBER SELECTION TABLES

The following compression member capacity tables are for Doug Fir Larch or Hem Fir single stud or post column capacity based on NDS 2005 and is typical wood members used in the Earthbound System. The capacities shown below are calculated individually. The members may be combined in multiples and do not require stitch nailing. The capacities shown are the lower of either compression perpendicular to grain or column buckling which is a function of the stud or post height. Other lumber grades are available upon request. Please visit <http://www.holdown.com> to use our free online stud and post design calculator!

COMPRESSION MEMBER SELECTION - DOUGLAS FIR LARCH													
FRAMING	LUMBER SIZE (SINGLE MEMBER)	LUMBER GRADE	PERP. TO GRAIN.	PARALLEL TO GRAIN, P _c (LBS) - SINGLE MEMBER STUD OR POST MEMBER HEIGHT (FT)									
				8 FT		9 FT		10 FT		11 FT		12 FT	
				(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-inch Wall	2x4	NO. 2	3,281	2,427	2,485	1,975	2,009	1,631	1,652	1,366	1,379	1,159	1,168
	3x4	NO. 2	5,469	4,045	4,142	3,292	3,348	2,718	2,753	2,276	2,299	1,931	1,947
	4x4	NO. 1	7,656	7,656	7,656	6,210	6,275	5,090	5,131	4,242	4,269	3,586	3,605
	4x6	NO. 1	12,031	12,031	12,031	9,730	9,838	7,981	8,049	6,654	6,699	5,627	5,658
	4x8	NO. 1	15,859	15,858	15,859	12,784	12,935	10,494	10,589	8,754	8,816	7,406	7,449
	4x10	NO. 1	20,234	20,130	20,234	16,251	16,456	13,352	13,480	11,145	11,229	9,432	9,490
	4x12	NO. 1	24,609	24,482	24,609	19,765	20,015	16,239	16,395	13,554	13,657	11,472	11,542
6-inch Wall	2x6	NO. 2	5,156	5,156	5,156	5,156	5,156	5,156	5,156	4,745	4,916	4,125	4,238
	6x4	NO. 1	12,031	12,031	12,031	12,031	12,031	12,031	12,031	12,031	12,031	12,031	12,031
	6x6	NO. 1	18,906	18,906	18,906	18,906	18,906	18,906	18,906	18,906	18,906	18,906	18,906
	6x8	NO. 1	24,922	24,922	24,922	24,922	24,922	24,922	24,922	24,922	24,922	24,922	24,922
	6x10	NO. 1	31,797	31,797	31,797	31,797	31,797	31,797	31,797	31,797	31,797	31,609	31,797
	6x12	NO. 1	38,672	38,672	38,672	38,672	38,672	38,672	38,672	38,672	38,672	38,444	38,672

COMPRESSION MEMBER SELECTION - HEM FIR													
FRAMING	LUMBER SIZE (SINGLE MEMBER)	LUMBER GRADE	PERP. TO GRAIN.	PARALLEL TO GRAIN, P _c (LBS) - SINGLE MEMBER STUD OR POST MEMBER HEIGHT (FT)									
				8 FT		9 FT		10 FT		11 FT		12 FT	
				(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-inch Wall	2x4	NO. 2	2,126	2,126	2,126	1,969	2,004	1,627	1,649	1,363	1,377	1,157	1,167
	3x4	NO. 2	3,544	3,544	3,544	3,282	3,340	2,712	2,748	2,272	2,296	1,928	1,944
	4x4	NO. 1	4,961	4,961	4,961	4,961	4,961	4,496	4,531	3,746	3,769	3,166	3,182
	4x6	NO. 1	7,796	7,796	7,796	7,796	7,796	7,049	7,108	5,876	5,915	4,968	4,995
	4x8	NO. 1	10,277	10,277	10,277	10,277	10,277	9,270	9,351	7,731	7,784	6,539	6,576
	4x10	NO. 1	13,112	13,112	13,112	13,112	13,112	11,795	11,905	9,842	9,915	8,329	8,379
	4x12	NO. 1	15,947	15,947	15,947	15,947	15,947	14,345	14,479	11,971	12,059	10,130	10,190
6-inch Wall	2x6	NO. 2	3,341	3,341	3,341	3,341	3,341	3,341	3,341	3,341	3,341	3,341	3,341
	6x4	NO. 1	7,796	7,796	7,796	7,796	7,796	7,796	7,796	7,796	7,796	7,796	7,796
	6x6	NO. 1	12,251	12,251	12,251	12,251	12,251	12,251	12,251	12,251	12,251	12,251	12,251
	6x8	NO. 1	16,149	16,149	16,149	16,149	16,149	16,149	16,149	16,149	16,149	16,149	16,149
	6x10	NO. 1	20,604	20,604	20,604	20,604	20,604	20,604	20,604	20,604	20,604	20,604	20,604
	6x12	NO. 1	25,059	25,059	25,059	25,059	25,059	25,059	25,059	25,059	25,059	25,059	25,059

1. TABLE IS BASED ON NDS 2005.
 2. DOUGLAS FIR LARCH PROPERTIES:
 - PERPENDICULAR TO GRAIN - 625 psi.
 - NO. 1 GRADE PARALLEL TO GRAIN: 1500 psi, MOE = 1700 psi.
 - NO. 2 GRADE PARALLEL TO GRAIN: 875 psi, MOE = 1300 psi.
 3. OTHER GRADES AVAILABLE UPON REQUEST.

HEM FIR PROPERTIES:
 - PERPENDICULAR TO GRAIN - 405 psi.
 - NO. 1 GRADE PARALLEL TO GRAIN: 1350 psi, MOE = 1500 psi.
 - NO. 2 GRADE PARALLEL TO GRAIN: 850 psi, MOE = 1300 psi.



HOW TO SPECIFY THE EARTHBOUND SYSTEM®

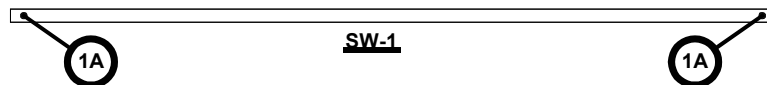
1) After the overturning loads are calculated per level, the Engineer may choose to round or "consolidate" holdown loads in a vertical, tabular format as indicated in the holdown table below. Holdown Run Type naming is shown as 1A, 2A, etc.

Table 1: Sample Holdown Run Type Table

RUN TYPE	1A	2A	2B	3A	4A	4B	5A	5B	5C	5G
LEVEL 5							4,420	4,420	4,420	9,940
LEVEL 4					4,420	4,420	4,420	4,420	4,420	13,530
LEVEL 3				4,420	4,420	4,420	4,420	6,900	6,900	13,530
LEVEL 2		4,420	4,420	4,420	6,900	6,900	6,900	9,940	9,940	20,710
LEVEL 1	4,420	4,420	6,900	6,900	6,900	9,940	6,670	9,940	13,530	28,190
ANCHOR BOLT DIA.	5/8"	5/8"	5/8"	5/8"	5/8"	3/4"	5/8"	3/4"	7/8"	*7/8" HS
ANCHOR PLATE SIZE	1/2 X 3-1/2	1/2 X 3-1/2	1/2 X 3-1/2	1/2 X 3-1/2	1/2 X 3-1/2	3/4 X 3-1/2	3/4 X 3-1/2	3/4 X 3-1/2	3/4 X 3-1/2	1 X 4

- 2) All anchoring components (bolt diameter and grade, anchor plate and embedment depth) are designed by the Engineer of Record.
- 3) "HS" shown in this example indicates "high strength" or Grade ASTM A193B7.
- 4) Anchoring plates shown are square for example. Anchoring plate design that is embedded in concrete per Engineer of Record.
- 5) Figure 1 below indicates how the holdown run may be specified in plan views. This view may be shown on every floor, or just on the first level floor plan if the floor plans are stacking.

Figure 1: Sample Holdown Plan View Callout



6) Sample Paragraph to include on the drawings:

Earthbound Seismic Holdown System

The seismic holdown system shall be fully self-compensating or self-tightening for wood shrinkage. The seismic holdown system shall not include holdown straps unless shown by the Engineering plans. The seismic holdown system shall have an ICC-ES evaluation on the shrinkage compensating devices and tested and evaluated in accordance to ICC-ES AC316. The seismic holdown system shall be the Earthbound System (ICC-ES ESR-2848 and ER-5378) and shall be supplied by Earthbound Corporation (formerly InQuest Engineering), Monroe, Washington (Phone: 800-944-5669). Substitutions for the Earthbound System must be pre-approved in writing by the Engineer.

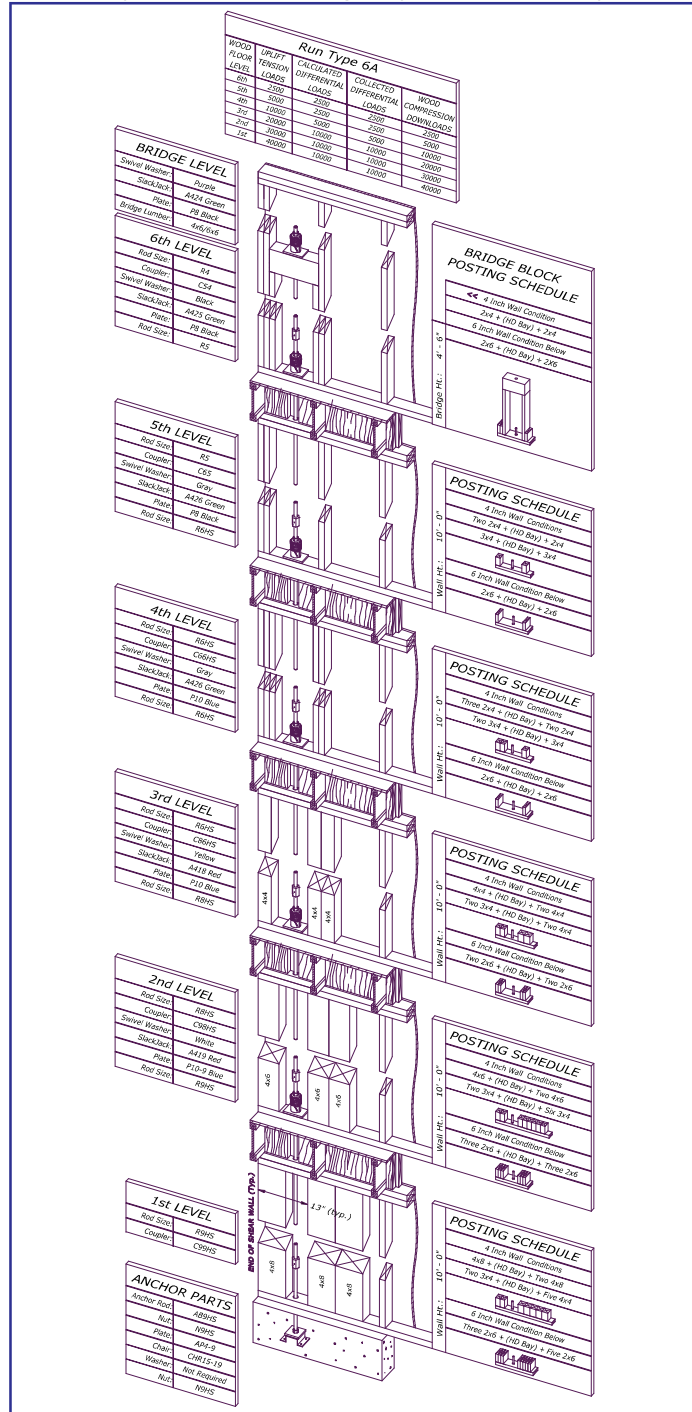
- 7) Additional required information to provide an accurate and fully value-engineered holdown system solution:
 - Design Code Requirements (e.g. UBC 97 / IBC 2003 / IBC 2006 / CBC 2007 / 2008 LABC)
 - Wall Heights (exterior elevations, etc)
 - Foundation Type (Post-Tensioned, Slab on Grade, Mild Steel Slab, etc.)
 - Anchoring details.
 - Holdown Locations.
 - Wall stud and plate lumber type.
 - Shear wall schedules.
- 8) Given the above information, Earthbound will provide complete installation shop drawings that conform to the plan requirements.
- 9) Our helpful Engineering staff is available by toll free number at 800-944-5669 or by email at techsupport@holdown.com.
- 10) For latest engineering information and design criteria, please visit us on the web at <http://www.holdown.com>.

RUNBUILDER.COM - AN ONLINE RUN SYSTEM DESIGN TOOL (Patent Pending)

- Free online tool to design Earthbound System Runs up to six stories!
- Supports IBC 06 and Threaded Rod Elongation Limits.
- Custom design wood compression members & print calc reports instantly!
- Register at runbuilder.com and start building runs today!

1) Setup Run Parameters

3) Actual Run Output (IBC 06 Shown)



2) Input Design Loads

ICC-ES EVALUATION REPORT ESR-2848 (Page 1 of 4)



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ICC-ES Evaluation Report

ESR-2848*

Issued June 1, 2009

This report is subject to re-examination in one year.

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A Subsidiary of the International Code Council®

DIVISION: 06—WOOD AND PLASTICS
Section: 06060—Connections and Fasteners

REPORT HOLDER:

EARTHBOUND CORPORATION
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EVALUATION SUBJECT

SLACKJACK® SHRINKAGE COMPENSATING DEVICE

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)

Property evaluated

Structural

2.0 USES

SlackJack® shrinkage compensating devices are used in conjunction with hold-down and tension tie connectors or a continuous tie-down system for wood frame construction. The devices are installed as components of the restraint system, with the threaded anchor bolts or rods passing through the axis of the devices, to remove slack in the restraint system that occurs due to wood shrinkage or building settlement, or both.

3.0 DESCRIPTION

3.1 General:

The SlackJack® is a factory-assembled, preloaded, compression-controlled shrinkage and settlement compensating device that can be used with hold-down connectors or tension tie connectors with threaded rods or threaded anchor bolts. The devices are cylindrical, and automatically expand axially along a rod or bolt, to eliminate any gaps between a bearing surface or plate and the nut on the threaded rod or bolt when shrinkage or settlement occurs within the structure. A portion of the SlackJack® is color-coded to identify the specific model number. Model numbers beginning with an "A" or "T" have aluminum bodies, and are designed for use with W3 through W10 swivel washers capable of fitting over

threaded rods or bolts having diameters ranging from $\frac{3}{8}$ inch to $1\frac{1}{4}$ inches (9.5 mm to 32 mm). Model numbers beginning with an "S" or "X" have steel bodies, and are designed for use with W10 or W12 swivel washers capable of fitting over threaded rods or bolts having diameters of $1\frac{1}{4}$ inches and $1\frac{1}{2}$ inches (32 mm and 38 mm), respectively. Model numbers beginning with an "M" (MiniJack™) have aluminum bodies, are designed for use without swivel washers, and will fit over threaded rods or bolts having diameters of $\frac{3}{8}$ inch and $\frac{1}{2}$ inch (9.5 mm and 12.7 mm). See Figure 1 for diagrams of each model type. See Table 1 for recognized models, and their corresponding color codes and dimensions. The SlackJack® "A", "T", "S" and "X" series are supplied with swivel washers, which are used to center the device on the threaded rod or bolt. Swivel washers are color-coded, as noted in Table 1, to indicate the corresponding appropriate threaded rod or bolt diameter. The SlackJack® "M" and A620 series are supplied with color-coded compression springs, as noted in Table 1, to indicate the specific model and rated compensation capacity.

3.2 Materials:

For the SlackJack® model numbers beginning with an "A", "T" or "M", the inner and outer cylinder bodies of the SlackJack® shrinkage compensating devices are manufactured from ASTM B 221-06 6061-T6511 alloy extruded aluminum tubing. Model numbers beginning with an "S" or "X" have inner and outer cylinder bodies manufactured from ASTM A 513-08a, Type 5 DOM steel tubing, as specified in the manufacturer's quality documentation. Locking rings are manufactured from ASTM A 313-08 stainless steel spring wire. The compression spring and pull clip are manufactured from galvanized hard-drawn spring wire. The color-coded capture ring consists of injection-molded plastic. The color-coded swivel washer is manufactured from ASTM A 108-07, grade 12L14 steel. A hex nut conforming to ASTM A 563-07 is included in the packaging of each device.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The allowable compression loads, corresponding deflections at allowable loads, and rated shrinkage and settlement compensation capacities for the SlackJack® shrinkage compensating devices designed under allowable stress design are as shown in Table 1. The devices are used where the expected shrinkage or settlement does not exceed their rated compensation capacities. Calculations, demonstrating that the applied loads do not exceed the

*Revised March 2010



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tabulated allowable loads, and that the expected slack due to wood shrinkage and building settlement does not exceed the rated compensation capacity for the SlackJack® shrinkage compensating devices, must be submitted to the code official for approval. Supports must be designed in accordance with the applicable code to transfer loads into the restraint system. The calculations must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.

4.2 Installation:

The SlackJack® shrinkage compensating devices must be installed in accordance with this report and the manufacturer's published installation instructions. The devices must be installed over the hold-down or a bearing surface or plate, with the threaded rod or bolt running through its axis. For the SlackJack® "A", "T", "S" and "X" series, the appropriate color-coded swivel washer corresponding to the threaded rod or bolt diameter, as indicated in Table 1, must be installed over each SlackJack® device, with the flat side facing up. The steel hex nut must be screwed onto the threaded rod or bolt, and hand-tightened over the top of the swivel washer. Once the hex nut is hand-tightened onto the swivel washer, the device must be activated by removal of the factory-installed pull clip.

5.0 CONDITIONS OF USE

The SlackJack® shrinkage compensating devices described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The SlackJack® shrinkage compensating devices must be installed in accordance with this report, the manufacturer's installation instructions and the plans approved by the code official. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
- 5.2 The design values given in this report are for the SlackJack® shrinkage compensating devices alone. No further increase in allowable capacity is permitted. Design must be performed in accordance with Section 4.1 of this report.

5.3 Calculations in accordance with Section 4.1 of this report must be submitted to the code official for approval.

5.4 The SlackJack® devices are limited to installations in dry, interior locations.

5.5 The SlackJack® shrinkage compensating devices must not be used to support dead loads other than their own weight.

5.6 Use of the SlackJack® shrinkage compensating devices in direct contact with fire-retardant-treated wood or preservative-treated wood is outside of the scope of this report.

5.7 When the SlackJack® shrinkage compensating devices are used as fasteners independent of a continuous tie-down system, the applied loads must not exceed the allowable loads noted in this report.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Shrinkage Compensating Devices (AC316), dated February 2008.

7.0 IDENTIFICATION

Each SlackJack® shrinkage compensating device bears a label, either on the body of the device or on the packaging, with the evaluation report holder name (Earthbound) and Web address, the product name (SlackJack®), and the evaluation report number (ESR-2848). The devices are color-coded, as indicated in Table 1, to identify the specific model and series number. SlackJack® shrinkage compensating devices are packaged together in a common box or container, which includes corresponding swivel washers and nuts labeled in separate plastic packaging. The SlackJack® "M" series (MiniJack™) devices are packaged in lots of five, and do not require a swivel washer.

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TABLE 1—SLACKJACK® SHRINKAGE COMPENSATING DEVICE SPECIFICATIONS

MODEL AND SERIES NUMBER	CAPTURE RING COLOR CODE	SPRING COLOR CODE	NOMINAL DIMENSIONS ³ (inches)			RATED COMPENSATION CAPACITY (inches)	ALLOWABLE COMPRESSION LOAD ^{1,2,4} (lbs)	DEFLECTION AT ALLOWABLE LOAD (inch)
			Height Before Activation (A)	Outer Diameter of Body (B)	Inner Diameter of Body (C)			
M100 ⁶	N/A	Red	2.215	1.349	0.407	1.0	3,500	0.017
M175 ⁶	N/A	Green	2.965	1.349	0.532	1.75	3,500	0.017
A210	Blue	N/A	3.330	2.365	1.420	1.0	7,360	0.013
A21-50	White	N/A	3.830	2.365	1.420	1.50	8,000	0.018
A220	Yellow	N/A	4.330	2.365	1.420	2.0	7,730	0.018
T410	Orange	N/A	3.700	2.365	1.375	1.0	9,000	0.020
T420	Black	N/A	4.700	2.365	1.375	2.0	9,000	0.018
A410	Red	N/A	3.800	2.365	1.250	1.0	14,000	0.022
A420	Green	N/A	4.800	2.365	1.250	2.0	14,000	0.030
A430	Brown	N/A	5.800	2.365	1.250	3.0	14,750	0.033
T610	Gray	N/A	4.325	2.365	1.250	1.0	15,000	0.019
T620	Purple	N/A	5.325	2.365	1.250	2.0	15,000	0.019
A610	Tan	N/A	4.800	2.365	1.250	1.0	20,340	0.028
A620	White	Blue	5.800	2.365	1.250	2.0	20,100	0.038
S410 ⁵	Blue	N/A	3.270	2.500	1.625	1.0	22,000	0.020
S420 ⁵	Yellow	N/A	4.270	2.500	1.625	2.0	22,000	0.026
X410 ⁵	Gold	N/A	3.700	2.500	1.625	1.0	34,220	0.035

MODEL AND SERIES NUMBER NOTATION FOR THE "A", "T", "S" AND "X" SERIES ⁶			
A	2	1	0
Model Type:	Series Type:	Rated Compensation Capacity:	Swivel Washer Color Code ^{4,5} :
"A" = Aluminum Body "T" = Aluminum Body "S" = Steel Body "X" = Steel Body	2 = 2 locking rings 4 = 4 locking rings 6 = 6 locking rings	1 = 1.0 inch 1-5 = 1.50 inches 2 = 2.0 inches 3 = 3.0 inches	0 = Base Model 3 = 3/8" Rod Orange 4 = 1/2" Rod Purple 5 = 5/8" Rod Black 6 = 3/4" Rod Gray 7 = 7/8" Rod Blue 8 = 1" Rod Yellow 9 = 1 1/8" Rod White 10 = 1 1/4" Rod Green 12 = 1 1/2" Rod Red

For SI: 1 inch = 25.4 mm, 1 pound = 4.45 N.

¹Tabulated allowable loads are for the SlackJack® shrinkage compensating devices only. The attached components (including anchors, tension rods, bearing plates, wood framing members, etc.) must be designed to resist design loads in accordance with the applicable code.

²No further increases to the tabulated allowable loads are permitted.

³See Figure 1 for dimensioned drawings of the SlackJack® shrinkage compensating devices.

⁴A swivel washer, having the appropriate inner diameter corresponding to the threaded rod or bolt diameter as indicated under the Swivel Washer Color Code section of the table above, must be used in accordance with Section 4.2. Exception: "M" series devices do not require swivel washers.

⁵Model numbers beginning with an "A" or "T" are designed for use with W3 through W10 swivel washers capable of fitting over threaded rods or bolts having diameters ranging from 3/8 inch to 1 1/4 inches (9.5 mm to 32 mm). Model numbers beginning with an "S" or "X" are designed for use with W10 or W12 swivel washers capable of fitting over threaded rods or bolts having diameters of 1 1/4 inches and 1 1/2 inches (32 mm and 38 mm), respectively.

⁶The model and series number notation given above does not apply to the "M" series (MiniJack™). The M100 and M175 have two locking rings, and rated compensation capacities of 1.0 inch and 1.75 inches, respectively. They are intended for use with either 3/8-inch or 1/2-inch rod diameters.



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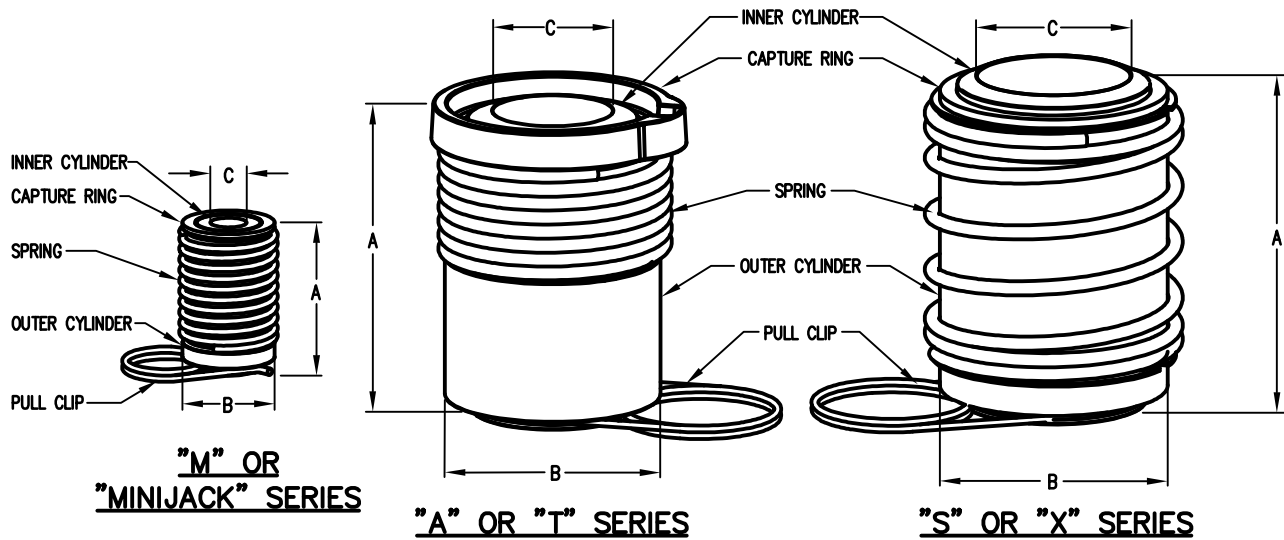


FIGURE 1 - SLACKJACK® SHRINKAGE COMPENSATING DEVICES

SLACKJACK® INSTALLATION SEQUENCE

KNOW SLACK-JACK™

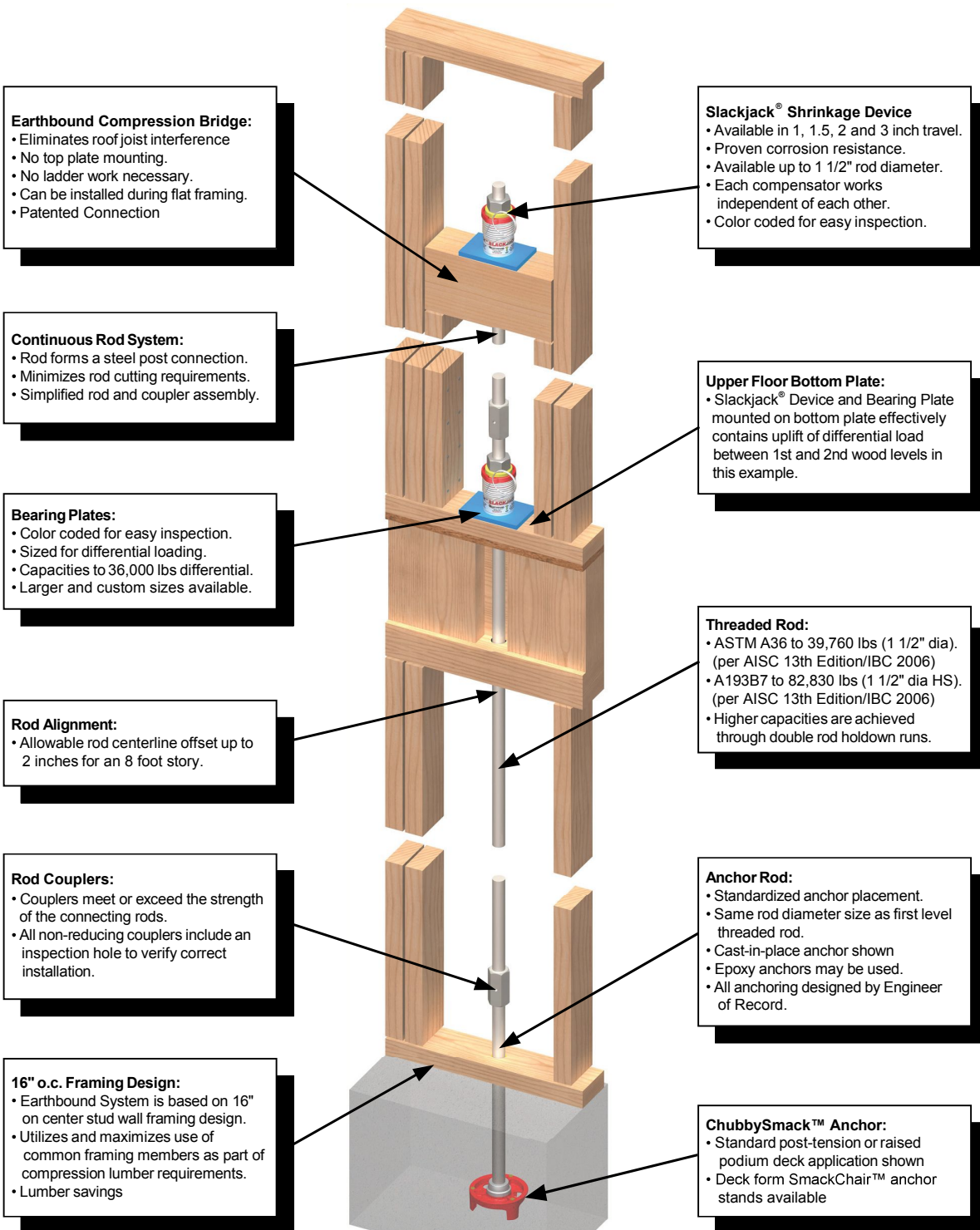
INSTALLATION SEQUENCE

Phone: 1-800-944-5669

1. BEARING PLATE
NOTE PLATE COLOR CODE FROM SHOP DWGS.
2. SLACKJACK®
NOTE RING COLOR CODE FROM SHOP DWGS.
3. SWIVEL WASHER
INSTALL WITH FLAT SIDE UP
NOTE WASHER COLOR CODE FROM SHOP DWGS.
4. HEX NUT
HAND-TIGHTEN
5. REMOVE PULL CLIP
6. STORE PULL CLIP



EARTHBOUNDtm



**The Earthbound System
featuring the SlackJack[®]**

**U.S. Patents 6,161,350, 6,494,564, 6,688,058, 6,951,078
7,159,366 & other U.S. and Foreign Patents Pending.**

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