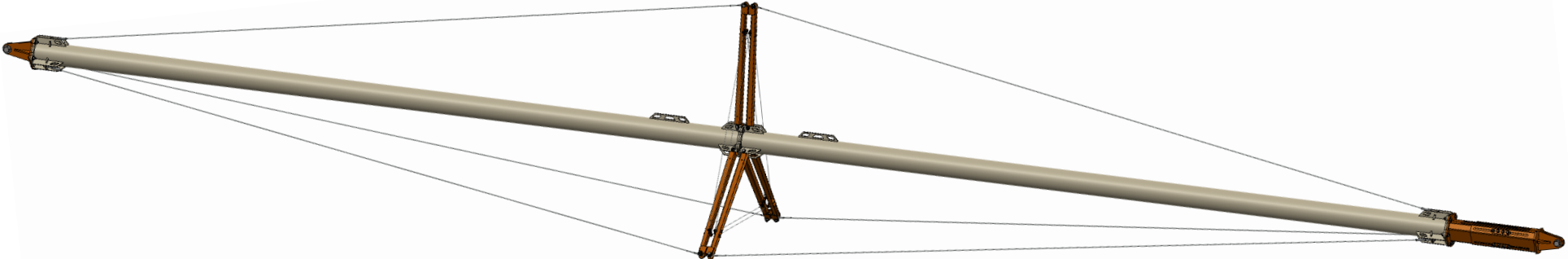
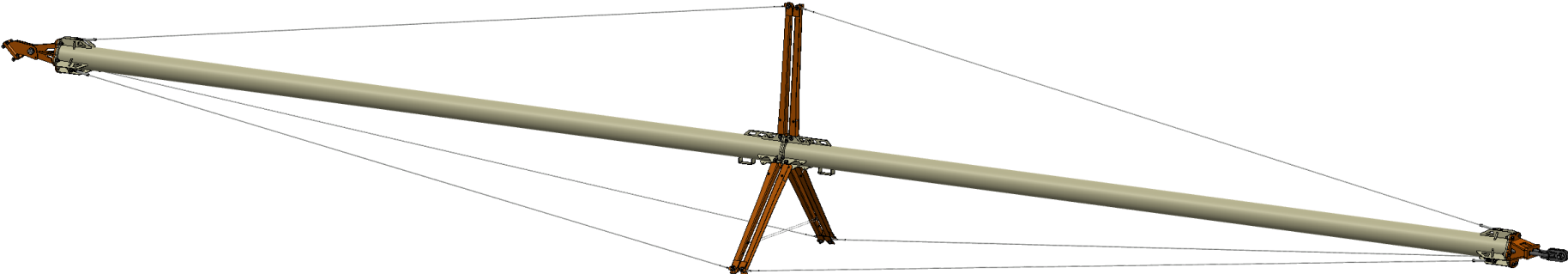


SkyBrace & Accessory Series

EQUIPMENT SAFETY, OPERATION, AND MAINTENANCE



SKB-100



SKB-110



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Document Info

Photographs, text, and sketches within the body of this manual may not exactly represent your equipment. In general, this manual contains the most up-to-date information available at the time it was produced. However, InnovaTech, LLC, cannot accept any responsibility, financial or otherwise, for any consequences arising out of the use of this material. The information contained herein is subject to change, and revisions may be issued to advise of such changes or additions.

InnovaTech, LLC, strives to continually improve their user documentation. If you have any questions or concerns about the content of this manual, we want to hear from you. Please e-mail us at support@innovatechservice.com or contact us by mail at:

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InnovaTech, LLC, is continually improving their equipment to bring you the latest in building system technology. For that reason, your SkyBrace may differ slightly from what is described in this document. If you have any questions, please contact us at support@innovatechservice.com.

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SkyBrace

Overview

The SkyBrace is engineered to perform temporary bracing of a structure during construction. It can be installed to brace the exterior main structural columns to provide stability against loads that a structure will be subjected to during the period in which the structure is not yet capable of handling moment loads, wind loads and other construction forces while initially being erected.

Unique SkyBrace Features

- Tension cables which add lateral and longitudinal support to SkyBrace.
- Cable struts non-symmetrically spaced around the tube; two cables on the bottom and one on top.
- Multiple ground attachment bases which can be connected to various configurations of helical piers, micropiles or concrete.
- Various bracketry for connecting to building structure.

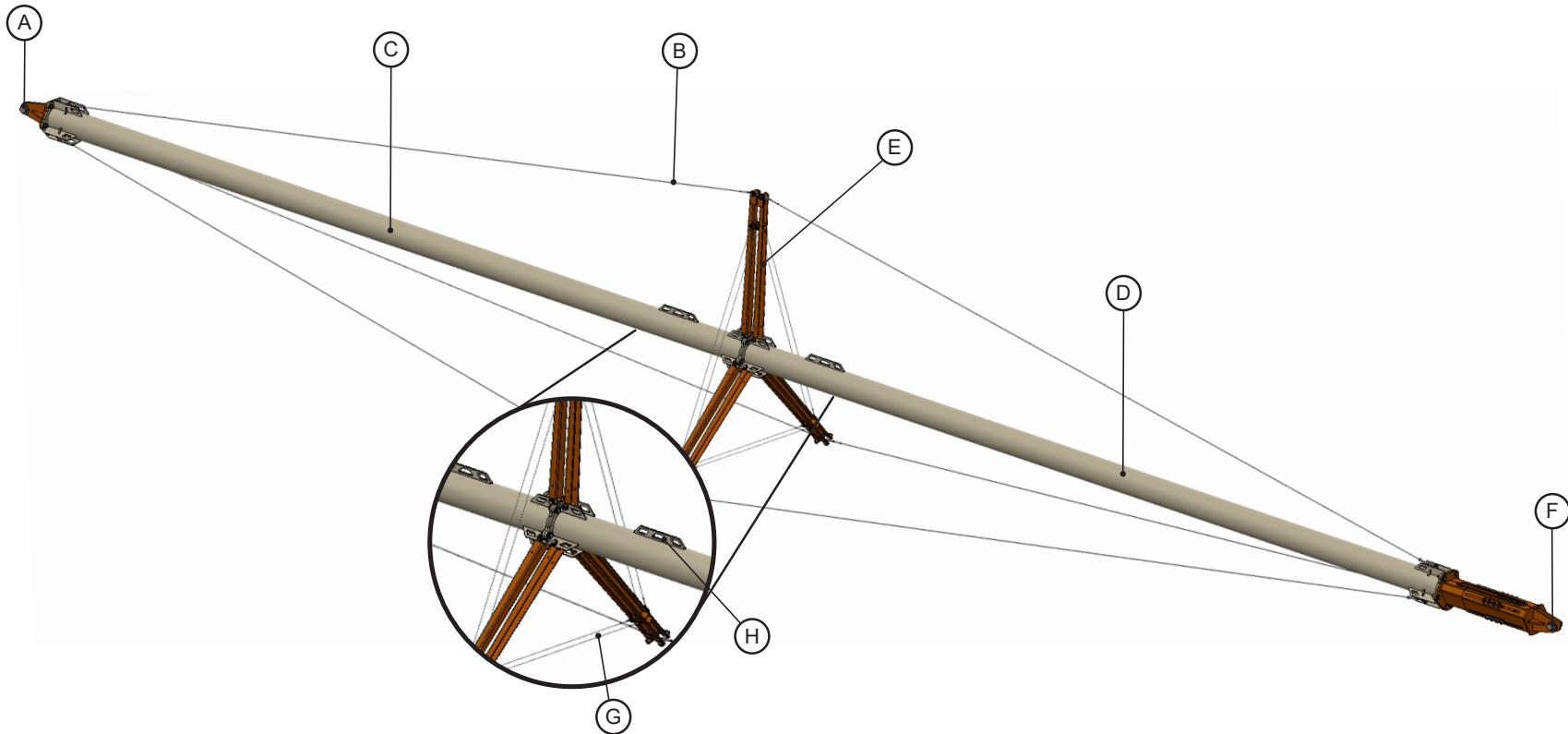
Differences Between Models

Feature	SkyBrace 100	SkyBrace 110
Extended-length for bracing tall structures	80 ft	78 ft
Extra strength rating	75 KIPS	75 KIPS
Unique methods of adjusting brace length for trueing the structure	Hydraulic Adjustment Unit with Slip Joint	Threaded Adjustment Unit
Strut support cables	Cables connecting all three cable struts	Cable connecting bottom struts only

SkyBrace tubes are not interchangeable between models.



SKB-100 Nomenclature



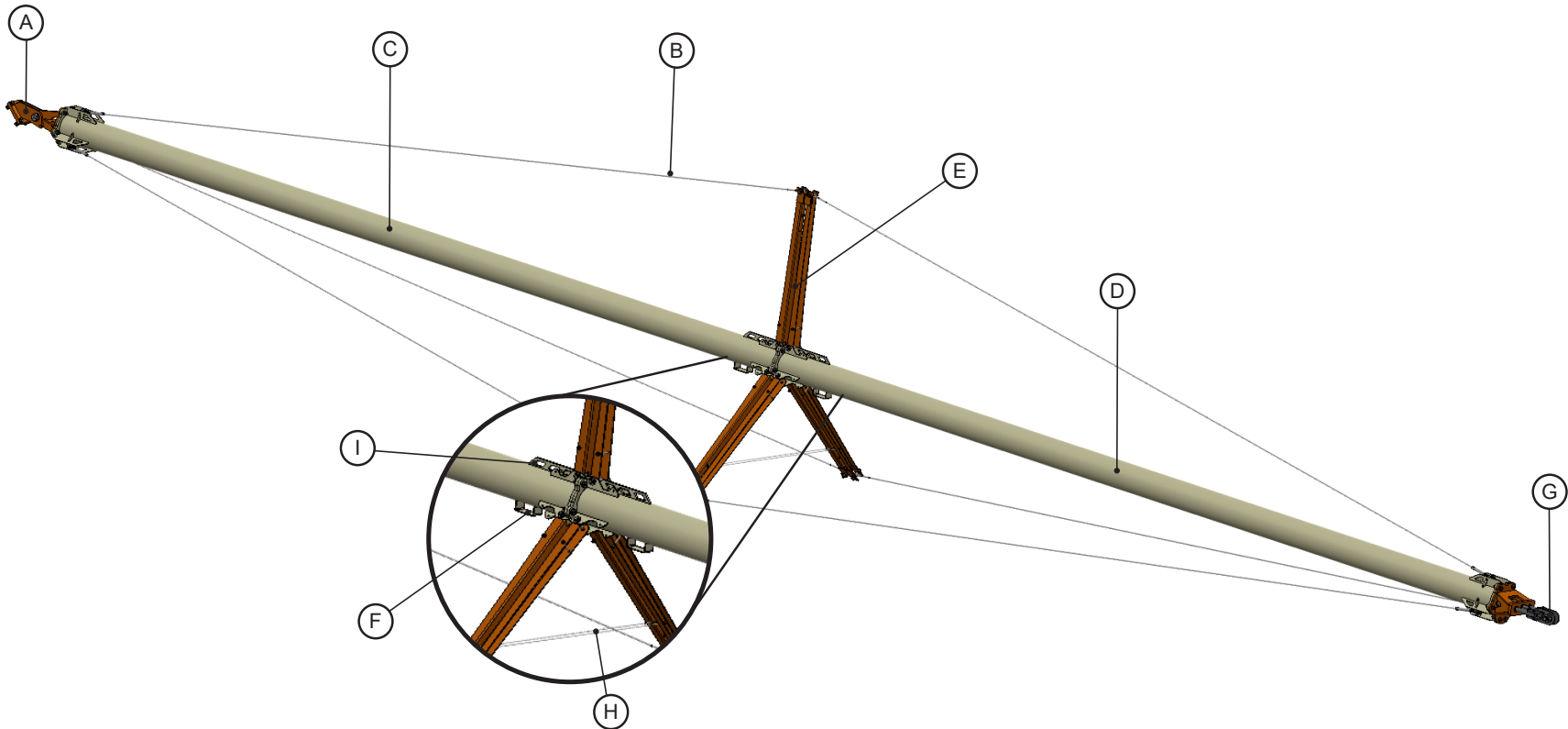
- A. Wall Adapter** - The upper tip of the SkyBrace that creates an attachment point to the main tube
- B. Support Cables** - Steel cables that add rigidity to the Main Tube Spans
- C. Upper Main Tube**- Upper half of tube assembly
- D. Lower Main Tube**- Lower half of tube assembly
- E. Cable Struts** - Steel struts that fold out perpendicular from the main tube to form a rigid strut for the support cables
- F. Master Bolt** - Main bolt connecting SkyBrace end to anchor point
- G. Strut Support Cables** - Supports the struts from lateral movement
- H. Hoist Points** - Hoisting point for transporting the SkyBrace

SKB-100 Specifications

Dimensions, weights, and capacities are listed below.

Description	Shipping Mode (Half-section of SkyBrace)	Erected
Net Weight	Approx. 1800 lbs.	3682 lbs.
Capacity	N/A	75 Kips
Overall Length	40 ft (Adjusting Unit 5')	80 ft (79'-81')
Overall Width	20 in.	9 ft. 10 in.
Overall Height	20 in.	11 ft. 8 in.
Adjusting Unit (8) Weight:	Approx. 500 lbs.	

SKB-110 Nomenclature



- I. Wall Adapter** - The upper tip of the SkyBrace that creates an attachment point to the main tube
- J. Support Cables** - Steel cables that add rigidity to the Main Tube Spans
- K. Upper Main Tube**- Upper half of tube assembly
- L. Lower Main Tube**- Lower half of tube assembly
- M. Cable Struts** - Steel struts that fold out perpendicular from the main tube to form a rigid strut for the support cables
- N. Fork Pockets** - Lifting point for transporting the SkyBrace
- O. Master Bolt** - Main bolt connecting SkyBrace end to anchor point
- P. Strut Support Cables** - Supports the struts from lateral movement
- Q. Hoist Points** - Hoisting point for transporting the SkyBrace

SKB-110 Specifications

Dimensions, weights, and capacities are listed below.

Description	Shipping Mode (Half-section of SkyBrace)	Erected
Net Weight	Approx. 1800 lbs.	3682 lbs.
Capacity	N/A	75 Kips
Overall Length	37 ft (Adjusting Unit 2 ft 9 in')	74 ft (79'-81')
Overall Width	20 in.	9 ft. 10 in.
Overall Height	20 in.	11 ft. 8 in.
Adjusting Unit Weight:		

Fasteners

The use of proper fasteners is imperative. Make no substitutions. Use SAE washers on the nut side of the connection. Refer to tables below for fastener type, location, and specs.

Fastener Abbreviation Key

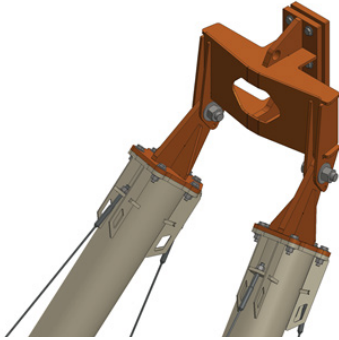
Location Name	Nomenclature Location	Quantity/Brace Assembly	Abbreviation
Adjustment Unit (SKB100)		1	AU
Master Bolt	Nomenclature, #G	2	MB
Cable Struts	Nomenclature, #E	6	CS
Upper Main Tube	Nomenclature, #C	1	UMT
Lower Main Tube	Nomenclature, #D	1	LMT
Wall Adapter	Accessories, Fig 1	1	FA
Double Fixed Adapter (if applicable)	Accessories, Fig 2	1	DFA
Support Cables	Nomenclature, #B	6	SC
Strut Support Cables	Nomenclature, #H	SKB100 - 6 SKB110 - 2	SSC

Fastener Specifications

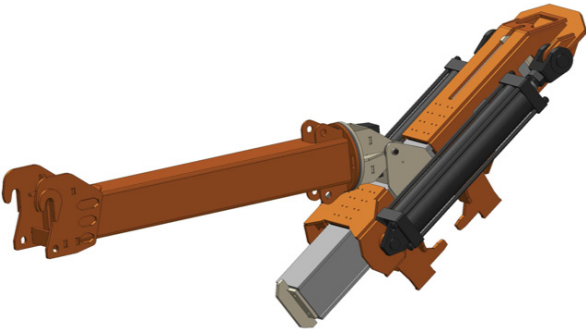

Connection	Description	Size	Torque
UMT - LMT	A325 Standard Bolt	1-8 x 4" with heavy hex nut and washer	500 ft / lb
LMT - AU	A325 Standard Bolt	1-8 x 4" with heavy hex nut and washer	500 ft / lb
MTS - FA/DFA	A325 Standard Bolt	1-8 x 4" with heavy hex nut and washer	500 ft / lb
SC - UMT/LMT	Grade 5 Standard Nut	1-8 standard nut	500 ft / lb
SSC - CS	Grade 5 Standard Nut	½ - 13 x 1 ¾" with heavy hex nut and washer	150 ft / lb
CS - CS	A325 Standard Bolt	1-8 x 3 ½" with heavy hex nut and washer	500 ft / lb

Accessories

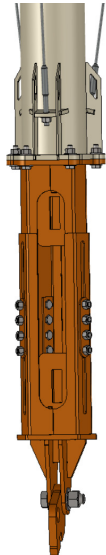
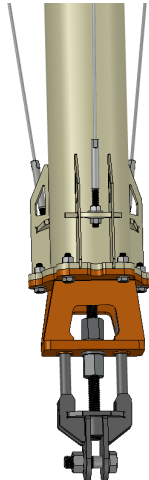
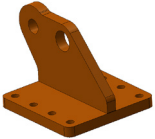
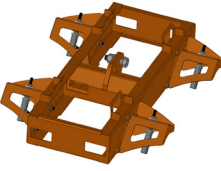
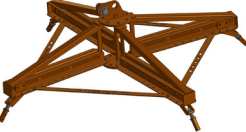

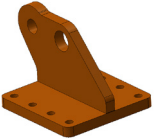
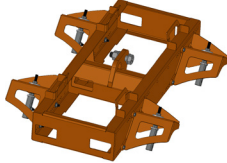
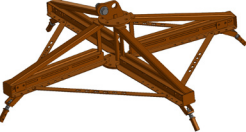
Compatible Brace-to-Wall Adapters

	
<p><i>Fig. 1: Column/Wall Fixed Adapter Bracket to SkyBrace</i></p>	<p><i>Fig. 2: Column/Wall to Dual Fixed Adapter to SkyBraces</i></p>
<p>Weight: 85 lbs.</p>	<p>Weight: 650 lbs.</p>

Brace Extension Accessories

	
<p><i>Fig. 3: SkyStretcher Mega - Hydraulic Adjustment Telehandler Attachment for setting the SkyBrace Adjustment Unit (see "SkyStretcher Mega" on page 15)</i></p>	<p><i>Fig. 4: SkyStretcher Mini - Hydraulic Adjustment Attachment for setting the SkyBrace Adjustment Unit (see "SkyStretcher Mini" on page 15)</i></p>
<p>Weight: 3,050 lbs. (Compatible with Xtreme Telehandler 2450, 3410)</p>	<p>Weight: 50 lbs. (Powered by HPU attached to skid)</p>

Compatible Base Adapters

<p>SKB-100</p>  <p>Fig. 5: SKB-100 Hydraulic Adjustment Unit</p>				<p>SKB-110</p>  <p>Fig. 6: SKB 110 Threaded Adjustment Unit</p>		
 <p>Fig. 7: Footing Connection</p>	 <p>Fig. 8: SkyBase100 with multiple helical pier connections</p>	 <p>Fig. 9: Multiple helical pier load distributor</p>	 <p>Fig. 10: Micropile Adapter</p>	 <p>Fig. 11: Footing Connection</p>	 <p>Fig. 12: SkyBase100 with multiple helical pier connections</p>	 <p>Fig. 13: Multiple helical pier load distributor</p>
		Weight: 1,120 lbs	Weight: 135 lbs			Weight: 1,120 lbs

Stowage Accessories

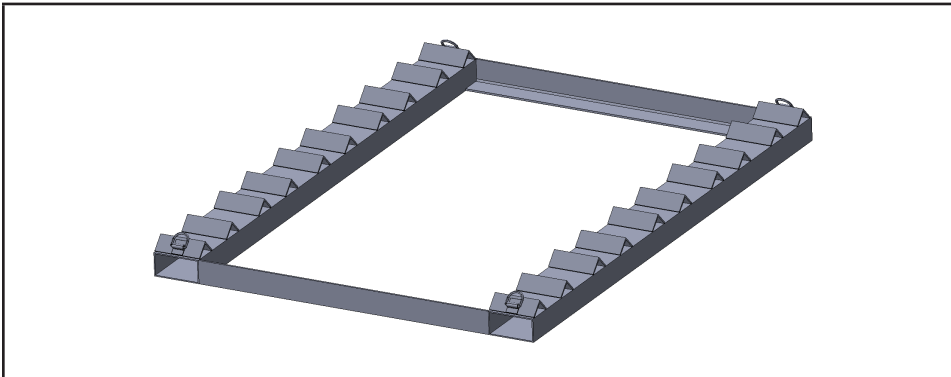


Fig. 14: SkyBrace Ship Crate

Weight: 350 lbs.

Capacity

SKB100

Refer the building plan and identify the necessary torque per bolt to achieve proper slip resistance of calculated loads. A decal copy of the chart below can be found attached to the SkyBrace 100 Adjustment Unit:

BRACE MAX CAPACITY 75 KIPS	
ALL FIGURES BASED ON SERVICE LOADS.	
ESTIMATED TORQUE PER BOLT (ft·lb)	SLIP RESISTANCE (k)
260	31.25
313	37.50
365	43.75
417	50.00
469	56.25
521	62.50
573	68.75
625	75.00

SKB110

The SkyBrace 110 capacity is 75 Kips.

Safety

This equipment was specifically designed to enhance safety in the steel construction work environment. Users should follow all safety regulations applicable to the work environment.

- Hand and eye protection should be used while assembling, adjusting and installing SkyBrace.
- If impact wrenches are used for tightening or loosening bolts, hearing protection should be used.
- Keep clear of pinch points.
- Only use specified hardware.
- Verify all bolts are properly torqued before applying loads to SkyBrace.

Training

Minimum training is needed to assemble or install SkyBrace. A structural brace plan should be acquired from an engineer. The brace plan should be followed by the SkyBrace user and the user should read this manual. A basic understanding of torquing bolts is needed for assembling and installing the SkyBrace. If the user has no experience torquing bolts they should be assisted by someone who has experience.

Only qualified individuals should be allowed to rig and hoist the SkyBrace.

Inspections

InnovaTech recommends a thorough inspection of the SkyBrace during assembly and regular visual inspections during use to prevent failures and identify potential hazards. Any component that is damaged or cracked should be removed from service. A competent person should perform inspections.

Visual inspections procedures should be completed for the following conditions:

- On a weekly basis
- After high winds (35 mph or more)

During assembly, a thorough inspection of all SkyBrace components should be performed:

1. Inspect Main Tube Spans for damage such as dents or cracks.
2. Inspect Cables for kinks, fraying, or wear. (Kinks in cables can reduce load ratings.)
3. Assure all Cable Fasteners are in place and secure.

4. Assure all connection bolts are the correct size and type, are properly installed with washers placed on the nut side of the connection, and properly torqued.
5. Assure Master Bolts are the correct size and type, and are properly installed, with washers placed on the nut side of the connection, and properly torqued.
6. Inspect all Accessory Brackets for cracks and assure that correct bolting is installed, secure and properly torqued.

If damages are found to be present that warrant repair or replacement, remove from service. DO NOT use SkyBrace components that are mechanically compromised.

Modifications

WARNING

Modifications to the SkyBrace or attachments could affect capacity which could result in catastrophic failure, death, or serious injury. DO NOT make modifications to the SkyBrace or attachments.

- DO NOT perform modifications or alterations.
- DO NOT burn or drill holes in the SkyBrace or attachments.

Work Area Safety

WARNING

Use proper safety procedures and avoid hazardous situations while installing the SkyBrace equipment to prevent death, serious injury, or property damage.

- Keep the work area clear of unauthorized persons, equipment, and any other hazards while installing the SkyBrace.
- Check for obstacles such as overhead power lines, and other temporary bracing.
- Follow established site-specific safety plans for erection paths on the work site.
- DO NOT attempt to inspect or install the SkyBrace equipment if you are using drugs, alcohol, or any medication that might impair your judgment or ability.

Assembly

Planning and Procedures

Follow approved erection sequence plans and procedures which have been approved by site overseers.

Proper techniques should be utilized by trained rigging personnel and crane operators while communicating with spotters with pre-arranged hand signals.

Assembly Steps

See “Fasteners” on page 6 for appropriate assembly hardware.

The Skybrace is stored and shipped in halves and must be assembled before use. Assembly requires a large work area and equipment to hoist and maneuver main tubes. To assemble Skybrace; bolt upper half to lower half. Upper half needs an adapter for connecting to structure. Lower half needs an adapter for connecting to an anchoring base.

1. Bolt main tubes together, making sure connection surfaces are clean..

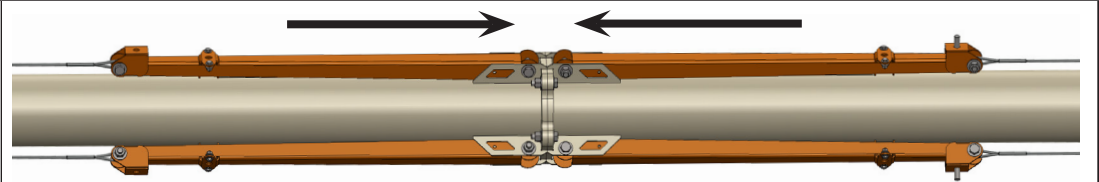


Fig. 15: Main tube connection

2. Using a forklift or other hoisting equipment, lift SkyBrace and fold out all 6 cable struts (3 per half) perpendicular to main tube. Bolt cable struts together back to back. Once the main tubes and cable struts are bolted, the Skybrace can be set on cable struts for staging before installation.

The unfolding of the Cable Struts and bolting-in-place performs the action of pre-tensioning the support cables. The tension must be overcome in order to fasten the Cable Strut pairs together.

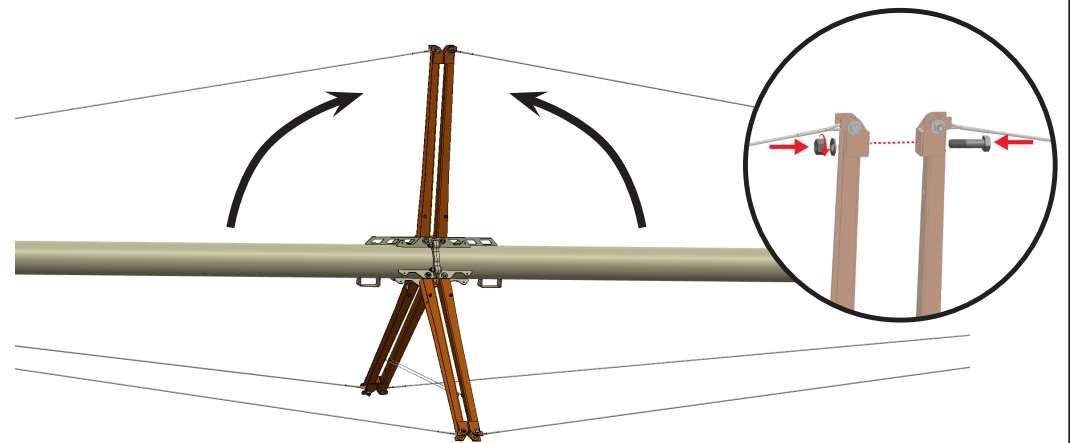


Fig. 16: Cable Strut Assembly

3. Choose the proper connection accessories and ready them for joining to the building and micropiles or foundations.

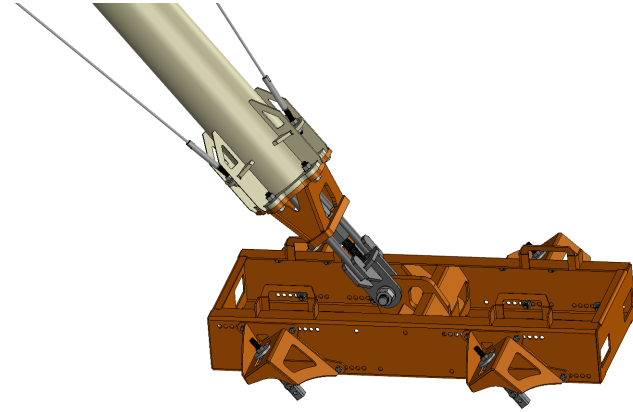


Fig. 17: SkyBase 100 connected to SKB-110

4. Once assembled, then the SkyBrace must pass inspection, and rigged for installation.

Installation

An anchoring base must be in place before Skybrace can be installed. Common anchoring bases are concrete or helical piers. If anchoring to concrete the SKB to footing adapter can be affixed to the concrete with eight 1" X 12" wedge anchor or concrete screw fasteners. If attaching to multiple helical piles the Skybase 100 or quadpod can be used to attach to 4 separate helical piles. The SKB to Micropile Adapter can be used to attach to 1 helical pile.

After a suitable anchoring base is in place the assembled SkyBrace can be hoisted into position, and affixed to the structure and anchoring base.

Once equipment is delivered onsite and preliminaries have been completed, the SkyBrace components must be completely assembled from shipping mode in order to be erected.

Identify the proper building connection accessories and bolting as well as preparations for micropile installations or footing connections.

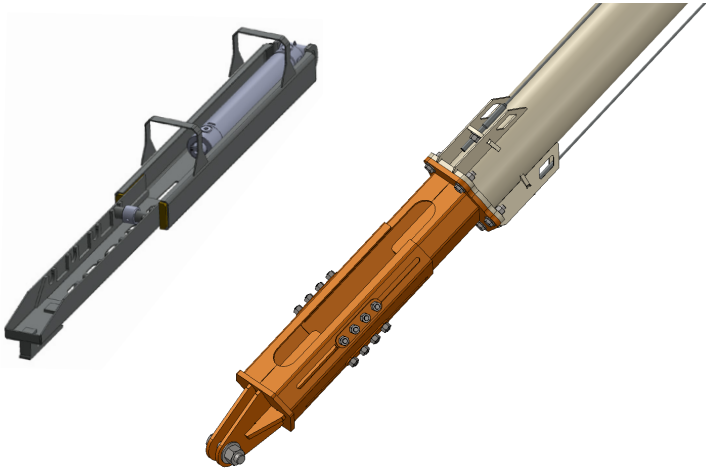
Once everything is arranged properly and the SkyBrace is assembled, rigged and placed in position, utilize the appropriate attachment to assist in truing and plumbing the supported structure and mounting in place. Follow the engineered torque specifications to finalize the installations. Flag and barricade all bracing.

Follow regular inspection procedures and intervals after installation.

To adjust and true the SkyBraces, determine which adjustment attachment is appropriate. Follow instructions below.

1. Once installation is complete, assure all braces are properly flagged and barricaded.

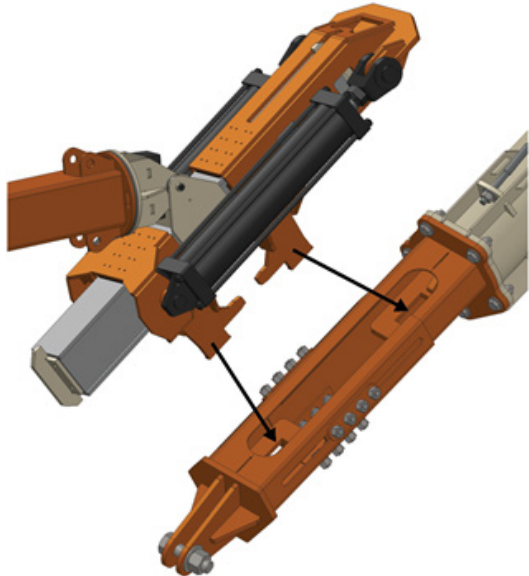
SkyStretcher Mini



Purpose

The SkyStretcher Mini is a small, hand-held hydraulic adjustment tool for the SkyBrace. It is powered by a portable hydraulic pump. The “Mini” is preferred when site conditions prohibit the “Mega” from accessing the SkyBraces.

SkyStretcher Mega



Purpose

The SkyStretcher Mega is a Forklift-powered hydraulic adjustment tool for the SkyBrace. It is designed to fit on a Size B Fork Carriage, and must be connected to the Forklift’s auxiliary hydraulics.

Adjustment Procedure

At least two competent people are required to perform a SkyBrace adjustment procedure: Forklift operator and spotter.

1. Forklift operator drives forklift to the brace and maneuvers the SkyStretcher Mega into the brace.
2. Spotter loosens the adjusting bolts on the adjustment unit. Then operator runs the aux hydraulics to true the beam, taking directions from spotter to determine how far to adjust the brace.
3. Spotter tightens the bolts in place.

SkyStretcher Mega Capacity Chart

Guage Pressure	Pushing Force lbs	Pulling Force lbs
500	38485	28863
550	42333	31750
600	46182	34636
650	50030	37522
700	53878	40409
750	57727	43295
800	61575	46182
850	65424	49068
900	69272	51954
950	73121	54841
1000	76969	57727
1050	80818	60613
1100	84666	63500
1150	88515	66386
1200	92363	69272
1250	96212	72159
1300	100060	75045

Guage Pressure	Pushing Force lbs	Pulling Force lbs
1350	103908	77931
1400	107757	80818
1450	111605	83704
1500	115454	86590
1550	119302	89477
1600	123151	92363
1650	126999	95249
1700	130848	98136
1750	134696	101022
1800	138545	103908
1850	142393	106795
1900	146241	109681
1950	150090	112567
2000	153938	115454
2050	157787	118340
2100	161635	121226
2150	165484	124113

Guage Pressure	Pushing Force lbs	Pulling Force lbs
2200	169332	126999
2250	173181	129886
2300	177029	132772
2350	180878	135658
2400	184726	138545
2450	188575	141431
2500	192423	144317
2550	196271	147204
2600	200120	150090
2650	203968	152976
2700	207817	155863
2750	211665	158749
2800	215514	161635
2850	219362	164522
2900	223211	167408
2950	227059	170294
3000	230908	173181

Removal

Once the structure is completed to the degree that the temporary bracing is no longer necessary, follow reverse methods for removal and stage the SkyBrace in a location to facilitate disassembly and storage and/or loading for transportation away from the site.

Attach rigging to Skybrace hoisting brackets, ensure pressure is relived from connection hardware before removing. Remove connecting hardware from top and base of SkyBrace. Skybrace can then be set down on cable struts.

Follow necessary inspections procedures and if damages are found to be present that warrant repair or replacement, remove from service.

Stowage & Logistics

When preparing the SkyBrace equipment for shipping, the components must be disassembled and adjusted into shipping mode. Make account for the weight of each piece and utilize proper load distribution, cribbing, and straps for safe transport and delivery.

SkyBraces are designed to be stowed in half-sections. For safety and standardization, stow and tighten all assembly connection hardware to “lower” half of brace before stowing. Ensure there are no loose hardware that could fall off during transit. Also, secure cables to brace using a cable clamp or durable tape.



Fig. 18: SkyBraces on Ship Crate

The SkyBrace ship crate is an accessory available to assist with stowing SkyBraces safely.

Warning

Use care when loading and unloading to avoid property damage as well as avoiding damage to the SkyBrace Main Tube Span and Support Cables. Adhere to proper rigging techniques and communicate with spotters with pre-arranged hand signals.

Assure adequate space for unloading, staging, and assembly of the SkyBrace.

Maintenance

SkyBrace has minimal maintenance. The wear items on the SkyBrace are bolts, worn bolts should be replaced during assembly. Spare bolts should be readily available before assembly begins. If the slip joint on the SkyBrace 100 has been used to yield under load the surfaces of the friction plates should be inspected for galling, if galling has occurred it should be removed from service.

Service Life

Skybrace service life is determined by inspection. The SkyBrace service life is not set by a predetermined amount of time, due to the many conditions and climates it may be exposed to. If any portion of the equipment is deemed unsafe or in poor repair, it should be removed from service. No portion of damaged equipment should be utilized for any length of time.

Replacement Manuals, Decals

Replacement manuals and decals for the SkyBrace can be obtained by contacting us by phone, mail, or email.

Contact Us

INNOVATECH, LLC

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Email support@innovatechservice.com