

TO,  
JAIGAD POWER TRANSCO LTD |  
OFF CHIPLUN-GUHAGAR ROAD |  
AT-MIRJOLI | POST- CHIPLUN- 415605 |  
MAHARASHTRA | INDIA |

**Kind Attention: Mr. Vaibhav Sansare**

Ref No. : MEPL/JTPL/22-23/2311

Date: 23/11/2022 Page: 1 of 1

**Subject** : Proposal for Aluminium Modular ERS System suitable for 400KV Power Lines  
**Reference** : (1) Telephonic Communication with Mr. Siddharth (+91-93211 90214)

Dear Sir,

Reference to the above, we humbly thank you for giving our company an opportunity to submit budgetary quotation for your requirement. Kindly refer below -

**OFFER**

Sr.	Items	Qty	Total Amount (Rs.)
1	<b>Aluminium Modular ERS System Set:</b> <ul style="list-style-type: none"> <li>Fit for 400KV Line bypass &amp; Restoration</li> <li>Total 2nos. of ERS Poles material per Set</li> <li>2nos. of 400KV Quad bundle Tension ERS Towers possible from Set material</li> </ul>	1 Set	3,75,00,000.00
2	<b>Standard ERS Tower Erection Tools Set</b> (1Set is offered to erect 1-ERS Poles at a time)	1 Set	
3	<b>ERS Design Software with 1-yr's Free up gradation &amp; support</b>	1 Nos.	
4	<b>20ft Storage Containers for ERS material</b>	2 Nos.	
5	<b>5days Field Installation &amp; ERS software Trainings at your site</b>	1 Nos.	
	Total F.O.R Amount =		3,75,00,000.00
	18% GST Amount =		67,50,000.00
	<b>Final Amount =</b>		<b>4,42,50,000.00</b>

**SALES CONDITION**

Delivery	Within 5months from Manufacturing clearance date
Incoterms	In Rupees, F.O.R Destination Basis (Up to Project site), exclusive of taxes
Taxes	GST Extra as per Table
Payment	40% Advance along with Purchase Order 60% by inland L/C at site (LC to be opened within 1month from PO date)
Warranty	12months for any manufacturing defect.
Documentation	User's manuals & Test Certificates
Transport	Included up to JSW stores
Validity	30 days from the date of submission of offer
Force Majeure	Applicable

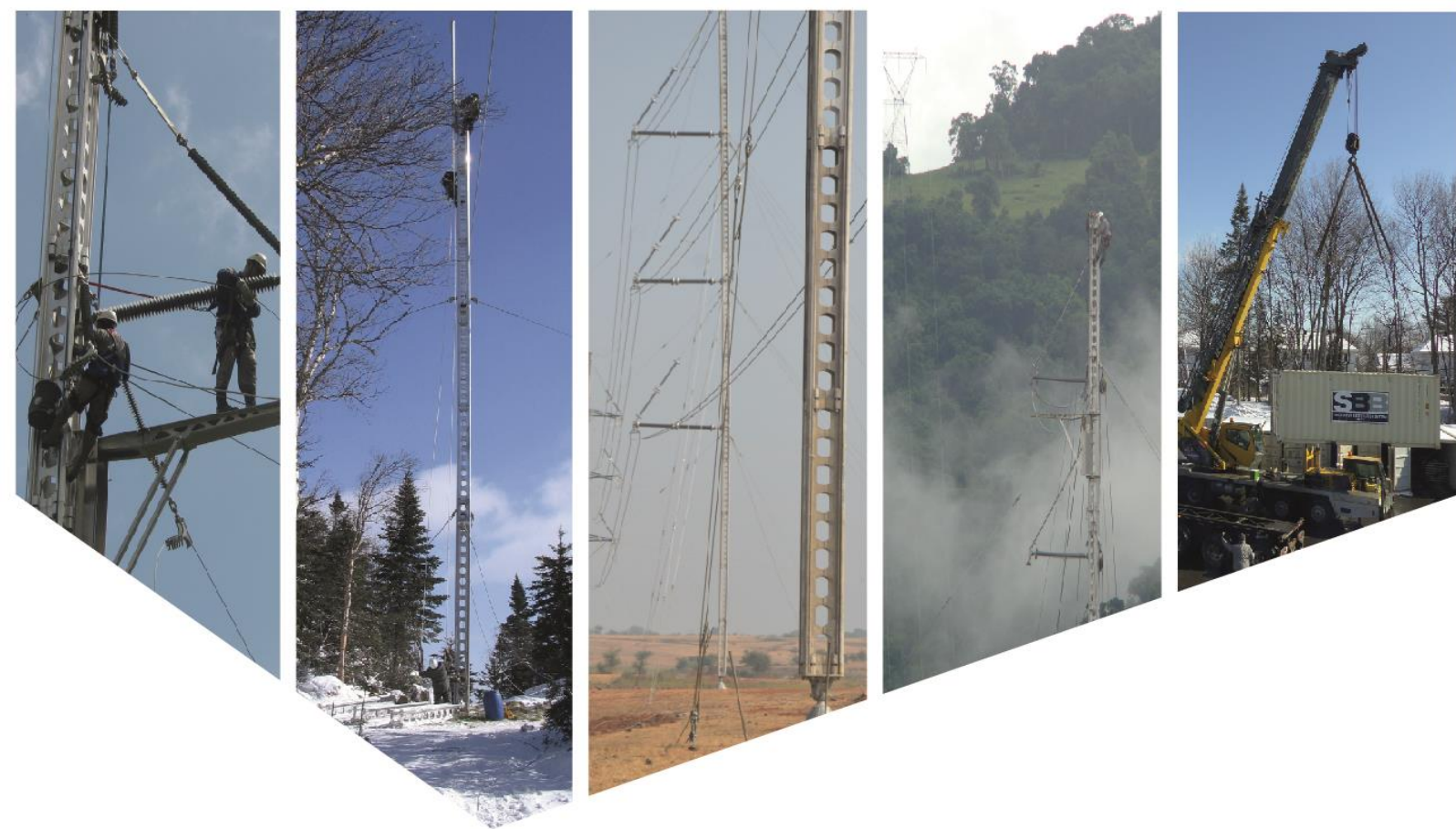
Should you need any further any further technical information/clarifications please contact our office or engineers on following given information –

We assure you our full co-operations & services at all times.

Yours Faithfully,  
For **Madhav Engineers Pvt Ltd**




**Authorized Signatory**



# ERS Proposal

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ERS Towers For 400KV Transmission Lines

2022-11-21

Presented to

**JSW**

India

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SBB ref. N° : 739001



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## 1 – INTRODUCTION

Client: **JSW**  
SBB Project No: 739001  
Date of proposal: 2022-11-21  
Quantity of towers to provide: 2 ERS Towers

## PROPOSAL

Following a request for **JSW**, SBB prepared this proposal for the supply of ERS Towers for 400kV lines in India .

The type and quantity of ERS Towers to be supplied is presented below.

## 2 – SBB CONFIGURATION

Based on the information received, SBB designed 1 ERS tower configuration for 400kV lines. Material for 400kV could be also used to create similar ERS towers for 220KV & 110KV. The table below summarizes the characteristics of the ERS configuration.

**Table 1 – SBB included configurations1**

Line Voltage	No.	SBB Configuration	Expected span	Expected line Angle	Height of SBB Structure (m)	Total Quantity of Structures
400kV	C1	Vertical Anchor	400m	0-60°	38.5m	2
Total Quantity of simultaneous structures						2

The configuration summary (including the complete design criteria) is presented in **Annexure A**. The Bill of Material (BOM), presented in **Annexure B**, was made in order to provide the required material to erect 2 ERS towers

With versatile SBB modular system, 69kV to 800kV ERS configurations can be made with few adjustments (see **Annexure D** for typical SBB ERS configurations).

## 4 – DETAILS

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Here are additional details on some inclusions or options:

### CONDUCTOR & EARTH WIRE CLAMPS

SBB included the appropriate clamps for conductor and regular earth wire clamps (OHGW).

### INSULATORS

The specifications of the suggested insulators are presented in **Annexure C**.

### FOUNDATION

SBB provides a lightweight aluminum foundation plate of 4' x 4' (1.22m x 1.22m) directly installed on the ground.

### ANCHORS

SBB quoted anchor plates 30'' x 30'' (0.76m x 0.76m) which have a great holding capacity and a wide range of application. In fact, it can be used in any soil where it is possible to excavate. An excavator is required to install those anchors (not included).

Although it is possible to excavate and recover the anchor after usage, SBB quoted some extra quantities in case replacement is needed.

We also quoted rock anchors. Please refer to BOM for the quantity. Other types of anchors are also available from SBB, if required.

### SETS OF EQUIPMENT FOR INSTALLATION

SBB included the appropriate number of sets of equipment for installing the towers. If more sets are required, we will be glad to update our offer.

## CONTAINERS

To ship and store the complete ERS material, maritime containers (6m) are quoted in this proposal.

SBB also included Container Storage System (CSS) where applicable. Bins, racks, shelves and protective tubes for insulators with clear identifications will accelerate the material selection and discharge without any heavy equipment.

## SOFTWARE

SBB uses a software program from Power Line Systems called PLS-CADD / LITE combined with PLS-POLE LW+MAST. This professional program fulfills the needs in ERS towers while being user friendly. No additional features are necessary for the purpose of ERS towers.

The PLS program comes with a one-year free upgrade and technical support.

## FIELD AND SOFTWARE TRAINING

SBB quoted for field and software trainings (respectively 5 and 3 days) in situ. It includes one SBB field trainer and one SBB engineer with all their expenses (but no other expense whatsoever related to client like food, travel, lodging, equipment rental, labour, conference room rental, etc.). Typical training requirements are detailed in **Annexure E**.

## GUARANTEE

SBB guarantees ERS material for 12 months after completion of the final delivery.

## TECHNICAL SUPPORT

SBB provides basic technical support for all its clients. However, if detailed engineering is required, SBB reserves the rights to charge fees.

## 5 – INCLUSIONS / EXCLUSIONS

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### INCLUSIONS

The following items are included in this proposal:

- Tower components (Refer to Bill of Material (BOM) in **Annexure B**);
- Equipment and tools (Refer to BOM);
- Composite insulators;
- Clamps for conductors & OHGW;
- PLS-CADD/LITE – PLS-POLE/MAST software;
- Field and software trainings (respectively for 5 and 3 days including all expenses);
- Required quantity of 6m Containers with storage system;
- Shipping CIP Port of Nhava Sheva, India ;
- Installation manual, drawings & technical support.

### EXCLUSIONS

Any item, equipment, tool or service not clearly included in this proposal should be considered excluded.

## 6 – DELIVERY SCHEDULE

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The delivery schedule of the material would be the following:

- About 12 to 14 weeks following the manufacturing clearance to prepare the order
- Shipping schedule will be available at the time of shipping

Given current challenging situation in international transport, please note the given delivery schedule is indicative only and is subject to change. We would keep you updated on monthly basis.



## 7 – PRICE VALIDITY & TERMS OF PAYMENT

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- The proposal is valid up to February 21, 2023.
- Terms of payment
  - 30% on order confirmation by wire transfer
  - 70% on readiness of the goods by wire transfer

For any questions or comments, please feel free to contact us.

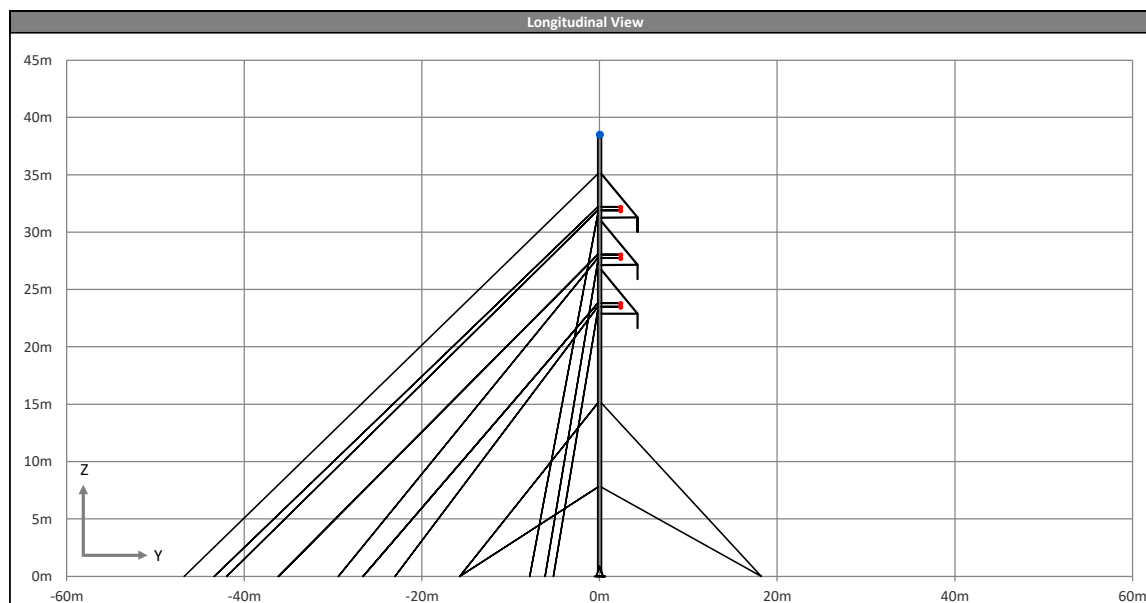
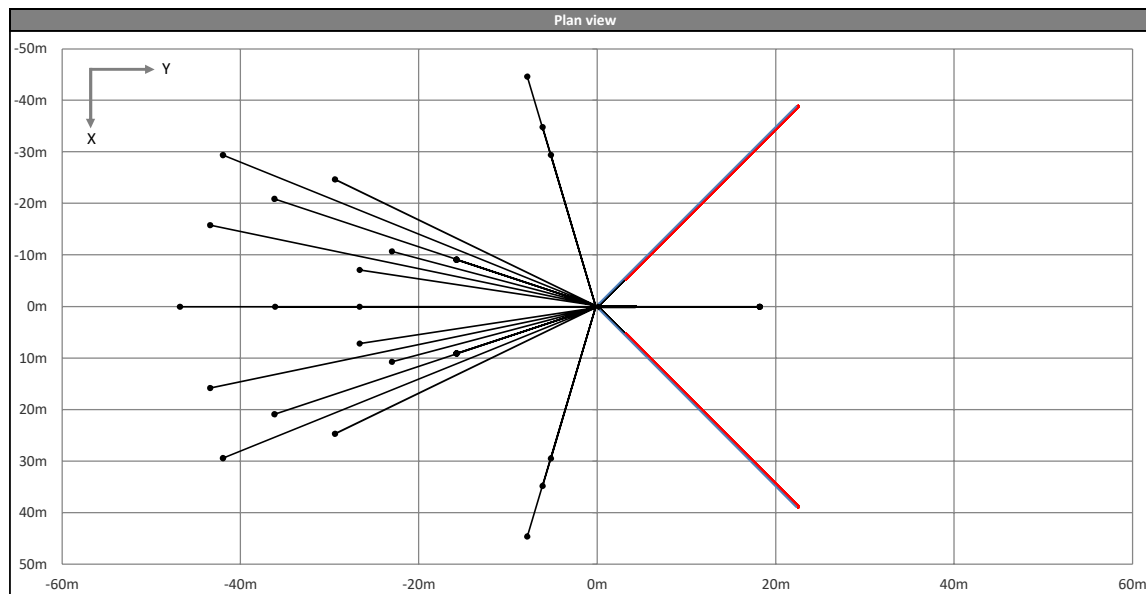
Thanks and best regards,

Steven Kaldas, B. Eng.

Project manager – Engineering  
**SBB inc.**

# ANNEXURE A

## CONFIGURATION SUMMARIES



Line & Tower specifications			
<b>Conductor</b>			
Simulated with:	Moose		
Qty per phase:	4		
Conductor diameter:	31.77 mm		
Conductor MBS:	161.1 kN		
<b>Earthwire</b>			
Simulated with:	7-3.66		
Diameter of earthwire:	10.98 mm		
Earthwire MBS:	68.4 kN		
<b>Line</b>			
Wind / Weight Span:	400 m		
Line angle:	Up to 60°		
<b>Loads &amp; loading conditions</b>			
Wind Pressure:	1186.8 Pa		
Radial ice:	no ice		
Tension crit. 1 (cond. at EDT After Creep):	22%		
Tension crit. 2 (ground wire at EDT After Creep):	17%		
Overload Vertical:	1.0		
Overload Horizontal:	1.0		
Overload Tension:	1.0		
Struct Wind Area Factor	1.0		
GRF on conductors:	1.0		
Cond. temp. EDT:	15 °C		
Cond. temp. WIND:	15 °C		
Cond. temp. COLD:	0 °C		
Cond. temp. HOT:	85 °C		
Simulated wind directions:	+/-90°, +/-45°, +/- 0°		
<b>Tower property</b>			
Tower Height:	38.5 m		
Footprint (x, y):	89.2 m x 65 m		
Earthwire to phase cl. (at the tower):	8.5 m		
Phase to phase dist.:	4 m		
Phase to ground cl. (at mid-span):	9.5 m		
Lowest conductor elev.:	23.4 m		
<b>Guy wire / Anchors</b>			
Number of guys wires:	27		
Type of guys (MBS):	9/16" EHS x 19 str. (150 kN)		
Number of anchors:	24		
<b>Insulators</b>			
Min. creepage distance:	13020 mm		
Line post diameter	90 mm	Single	
Suspension / strain MBS:	230 kN	Twin	
<b>Strength Factors</b>			
Insulators (tension / comp.):	70% / 80%		
Hardware:	60%		
Guys wires:	65%	Others:	60%

Designed by: Steven Kaldas, B. Eng.

Date: Nov 21, 2022

# ANNEXURE B

## BILL OF MATERIAL (BOM)

<div><div>SBB</div><div>INNOVATION IN ALUMINIUM</div></div> <div>BILL OF MATERIAL (BOM)</div> <div>JSW - 739001</div> <div>Nov 21, 2022</div>			Per Config	Total 400kV		Spares Qty	Grand Total for 1 set
Picture	SBB Item No.	Description	VS 400kV	VS 400kV	Total Qty		
			C1	C1			
			1	2			
Tower Components							
	SFP-1231	Large Primary Sub-Foundation 3.8m² (made with steel pieces & bolts)	1	2	2		2
	SFS-3124	Large Secondary Sub-Foundation 7.60m² (made with steel pieces & bolts)	1	2	2		2
	BPL-0150	Aluminum Base Plate 1.5m² x 22mm (4' x 4' x 7/8")	1	2	2		2
	ABS-4101	Articulated Base	1	2	2		2
	MSC-4190	Mast Section 412mm x 2.9m long Weight < 136kg	13	26	26		26
	034-0900	Bolts 3/4"Ø x 9" (19mm x 228mm) For Mast Sections With 2 SS Washers and 1 GA Lock Washer	104	208	208	37	245
	UNB-4100	Universal Bracket	17	34	34	2	36
	TPL-4101	Top Plate	1	2	2		2
	034-0512	Bolts 3/4"Ø x 5½" (19mm x 139mm) For Top Plate Assembly With 2 SS Washers and 1 GA Lock Washer	4	8	8	27	35
	LPA-10S0	Line Post Insulator Bracket	3	6	6		6
	LPF-20S0	Line Post Insulator End Fitting For 127 or 152mm bolt circle (5" or 6")	3	6	6		6
	YPL-LK20	Yoke Plate Link 200mm	3	6	6		6
	YPL-LK36	Yoke Plate Link 360mm	3	6	6		6
	YPL-2C00	Delta Yoke Plate	24	48	48		48
	EPL-BR4A	Extension plate for 400kV	3	6	6		6
	EPL-0200	Extension Plate 200mm	36	72	72		72
	GSI-1300	Guy Strain Insulator For guys near phases	24	48	48		48
	G99-0500	Guy Cable 9/16" EHS x 19 str. x 500m on a wooden reel MBS of 149.9kN	2	4.84	4.84	1.16	6
















<div><div>SBB</div><div>INNOVATION IN ALUMINIUM</div></div> <div>BILL OF MATERIAL (BOM)</div> <div>JSW - 739001</div> <div>Nov 21, 2022</div>			Per Config	Total 400kV		Spares Qty	Grand Total for 1 set
Picture	SBB Item No.	Description	VS 400kV	VS 400kV	Total Qty		
			C1	C1			
			1	2			
Tower Components							
	PRG-916L	Preformed Grip for Cable 9/16"	27	54	54	3	57
	WRT-0580	Wire Rope Thimble 5/8" (for preformed grip 9/16")	27	54	54	46	100
	GLK-2440	Automatic Dead End Guy Link (for guy 9/16")	27	54	54		54
	ASH-0340	Anchor Shackle 3/4" BNK (with bolt / nut & cutter pin)	128	256	256	24	280
	ASH-1000	Anchor Shackle 1" BNK (with bolt / nut & cutter pin)	6	12	12	8	20
	ASH-1140	Anchor Shackle 1-1/4" BNK (with bolt / nut & cutter pin)	14	28	28	8	36
	APL-0580	Anchor Plate 30" x 30" (0.76m x 0.76m)	24	48	48	10	58
	ARK-4B40	Expanding Rock Anchor 48" (1.22m) long (including eye)	12	24	24	5	29
	ISS-505Y	Polymer Suspension Insulator	15	30	30		30
	ILP-509R	Polymer Line Post Insulator	3	6	6		6
	CSS-3700	Corona Ring for Suspension Insulator	15	30	30		30
	CLP-3800	Corona Ring for Line Post Insulator	3	6	6		6
	CSC-3139	Suspension Clamp	12	24	24		24
	CAC-1832	Strain Clamp	24	48	48		48
	CAC-0718	Strain Clamp	2	4	4		4
	TEJ-0112	Turnbuckle Eye-Jaw 1"-12"	3	6	6	2	8
	CLK-0340	Chain Link 3/4"	12	24	24	6	30



# **BILL OF MATERIAL (BOM)**

JSW - 739001

Nov 21, 2022

Picture	SBB Item No.	Description	Qty for 1	Spares per set	Grand Total for 1 set
<b>SBB Equipment &amp; Tools</b>					
	QSG-41R3	Sliding Ginpole (complete with swivel pulley)	1		1
	QBG-0300	Ball-Joint Ginpole	1		1
	QFA-60CE	Riggers Fall Arrest Device	2		2
	QAC-600L	Alignment Clamp (For jointing 2 mast sections)	2		2
	QSP-2500	Stake Plate used with EQU-ST15 & EQU-STPE	8		8
	QST-2550	Stakes To stabilize base plate or stake plate when inserted into the ground	100	8	108
	QSE-2500	Stake Plate Extension To increase Stake Plate capacity	24		24
	QSR-2500	Rod Remover To remove stakes	2		2
	QRP-4100	Resting Platform	2		2
	QSB-20R0	Tensioning Device for conductors (to move the conductors from the pulley to the clamps)	1		1
	QWP-4150	Working Platform	1		1
	QHD-1000	Gasoline Hammer-Driller For stake installation and rock drilling	1		1
	QDK-4220	Rock Drilling Kit For rock anchors (including 600mm and 1200mm ext. and 2 drilling bits)	1		1
	QAG-R916	Automatic Grip for cable 9/16"Ø (14.3mm)	4		4
	QTB-20E0	Tool Box, including: 15" ratchet, erection wrench and other assorted tools.	1		1



# BILL OF MATERIAL (BOM)

JSW - 739001

Nov 21, 2022

Picture	SBB Item No.	Description	Qty for 1	Spares per set	Grand Total for 1 set
<b>SBB Equipment &amp; Tools</b>					
	QSH-1200	5kg (12lbs) Sledge Hammer,	2		2
	QPH-4120	Swivel Pulley with hook	2		2
	QPW-2000	Gasoline Capstan (for hoisting ERS material)	1		1
	QRO-12RE	1/2"Ø Double Braided Polyester Rope Kit For lifting mast sections or other material (3 ropes in bags; total of 400m (±1300'))	1		1
	QBU-1000	Tool Bucket For hoisting of hardware and tools	2		2
	QPE-1000	Pulling Eye To give an additional attachment eye on an anchor rod	4		4
	QHC-28E0	Manual Hydraulic Wire Cutter For steel cable up to 28mm	1		1
	QCP-110R	1.5T Chain Puller (with 10' chain)	4		4
	QGP-170R	1.5T Grip Puller (with 70m cable)	8		8
	QNS-2060	2m (6') Nylon Sling	4		4
	QNS-2100	3m (10') Nylon Sling	4		4



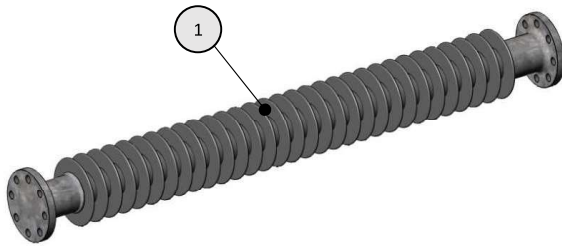
# ANNEXURE C

## INSULATOR DRAWINGS

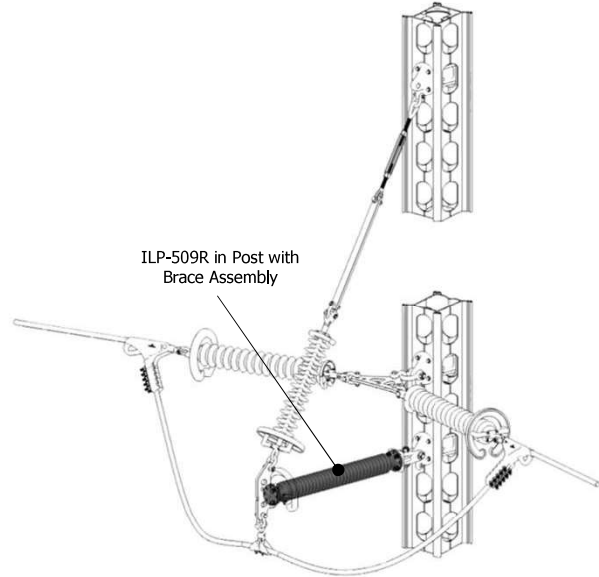
Aluminum Modular Guyed Tower

## SBB TOWER COMPONENTS

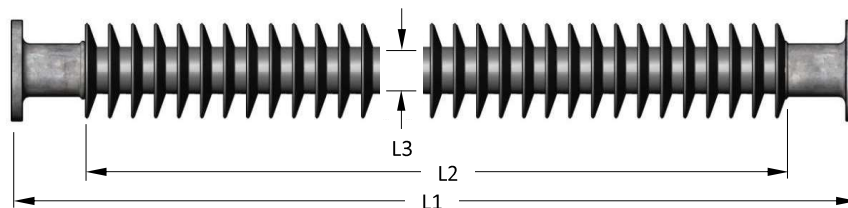
- Standards: IEC 61952 / 60273, ASTM A153 (latest issues)



Electrical Values (kV)	
Power Frequency Dry Flashover	880
Power Frequency Wet Flashover (withstand)	680
Critical-Impulse Flashover (withstand), Pos.	1550
Critical-Impulse Flashover, Neg.	1850
(1): Final values may be slightly different from those above	



Bill of Material				
No.	Qty	Description	Material	Weight (kg)
1	1	Composite Line Post Insulator	Cast Iron / Composite	92.5



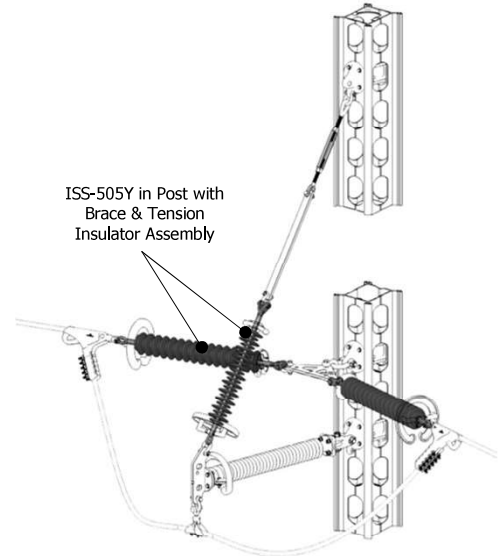
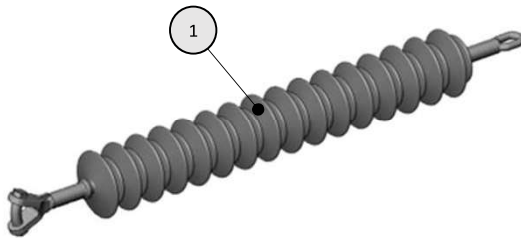
Item Properties		Dimensions (mm)			
Ult. Cap. (kN)	Allow. Cap. (kN)	Leakage / creepage Distance	L1	L2	L3 core
120	84	13020	3500 ± 50	3200	90
(1): Unless Otherwise Specified, General Tolerances are: +/-2mm					

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Aluminum Modular Guyed Tower

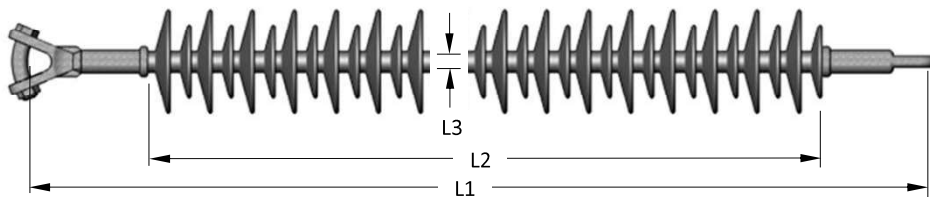
### SBB TOWER COMPONENTS

- Standards: IEC 61109, ASTM A153 (latest issues)



Bill of Material				
No.	Qty	Description	Material	Weight (kg)
1	1	Composite Suspension Insulator	Cast Iron / Composite	25.2

Electrical Values (kV)	
Power Frequency Dry Flashover	880
Power Frequency Wet Flashover (withstand)	680
Critical-Impulse Flashover (withstand), Pos.	1550
Critical-Impulse Flashover, Neg.	1850
(1): Final values may be slightly different from those above	





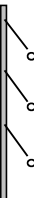

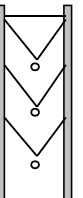


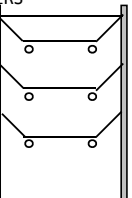
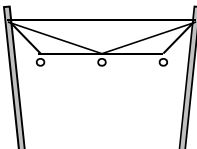
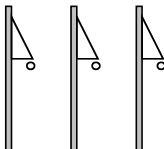
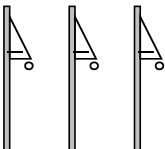
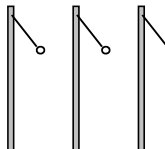
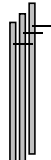
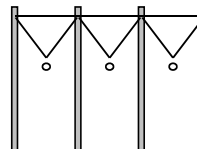
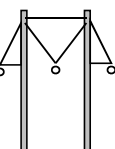




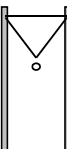

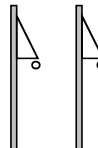
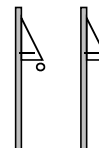
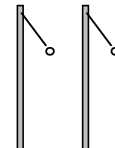
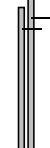
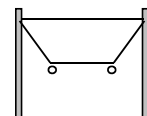


Item Properties		Dimensions (mm)			
Ult. Cap. (kN)	Allow. Cap. (kN)	Leakage / creepage Distance	L1	L2	L3 core
230	161	13020	3826 ±50	3225	24
(1): Unless Otherwise Specified, General Tolerances are: +/-2mm					

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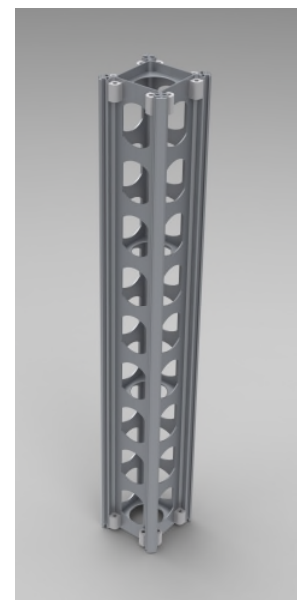
# ANNEXURE D

## TYPICAL SBB ERS CONFIGURATIONS

Delta & Vertical circuit	 DEL  DELA  VS  VA  RA  TER  HER  DVS  DVA  DHER
Horizontal Circuit	 CH  S3M  A3M  RA3M  TER3M
Horizontal & 1 Phase	 HER4M  S2M  S1P  A1P  RA1P  TER1P  HER1P
2 Phases / DC	 S1MDC  S2M  A2M  RA2M  TER2M  HERDC

SBB#	Description	Type	Line Voltage <sup>(1)</sup>	Line angle <sup>(1)</sup>	Phase Qty
DEL	Delta	Suspension	Up to 275kV	0-5°	3
DELA	Delta Anchor	Anchor	Up to 275kV	0-5°	3
VS	Vertical Suspension	Suspension	Up to 500kV	0-15°	3
VA	Vertical Anchor	Tension	Up to 500kV	0-90°	3
RA	Running Angle	Suspension	Up to 800kV	15°-30°	3
TER	Terminal	Terminal	Up to 800kV	-	3
HER	Herringbone	Suspension	Up to 800kV	0-5°	3
DVS	Double Circuit Vertical Suspension	Suspension	Up to 275kV	0-5°	6
DVA	Double Circuit Vertical Anchor	Tension	Up to 275kV	0-5°	6
DHER	Double Circuit Herringbone	Suspension	Up to 500kV	0-5°	6
CH	Chainette	Suspension	Up to 800kV	0-5°	3
S3M	Suspension 3 Masts	Suspension	Up to 500kV	0-15°	3
A3M	Anchor 3 Masts	Tension	Up to 500kV	0-90°	3
RA3M	Running Angle 3 Masts	Suspension	Up to 800kV	15°-30°	3
TER3M	Terminal 3 Masts	Terminal	Up to 800kV	-	3
HER4M	Herringbone 4 Masts	Suspension	Up to 800kV	0-5°	3
S2M	Suspension 2 Masts	Suspension	Up to 275kV	0-5°	3
S1P	Suspension 1 Phase	Suspension	Up to 765kV	0-15°	1
A1P	Anchor 1 Phase	Tension	Up to 765kV	0-60°	1
RA1P	Running Angle 1 Phase	Suspension	Up to 800kV	15°-30°	1
TER1P	Terminal 1 Phase	Terminal	Up to 800kV	-	1
HER1P	Herringbone 1 Phase	Suspension	Up to 800kV	0-5°	1
S1MDC	Suspension 1 Mast / DC	Suspension	Up to 275kV	0-15°	2
S2M	Suspension 2 Masts / DC	Suspension	Up to 500kV	0-15°	2
A2M	Anchor 2 Masts / DC	Tension	Up to 500kV	0-90°	2
RA2M	Running Angle 2 Masts / DC	Suspension	Up to 800kV	15°-30°	2
TER2M	Terminal 2 Masts / DC	Terminal	Up to 800kV	-	2
HERDC	Herringbone / DC	Suspension	Up to 800kV	0-5°	2

(1): For reference only. May vary according to the loads.



All with the same 412 x 412 mast section

## **ANNEXURE E**

### TYPICAL SBB ERS FIELD AND SOFTWARE TRAINING



**Scope:** SBB field and engineering / software training is designed to help experienced engineers, technicians and linemen to design, plan and erect efficiently and safely SBB ERS towers.

**Field training duration:** 5 consecutive working days

**Engineering / software training duration:** 3 consecutive working days (in parallel to field training)

**Working schedule:** 8 to 10 hours per day for field training  
6 to 8 hours per day for engineering / software training

**Detailed schedule:** See schedule next page

**Extra days:** If ever extra time is requested by the client and SBB trainers are available, fees of 4 000 USD per additional day will be charged.

**SBB trainers:** One SBB engineer and 1 experimented SBB field trainer

**Training languages:** English, French or Spanish (for other needs, please contact us)

### Planning the training and general requirements

- A. **Training dates** should be agreed on at least 1 month prior to training week and should be kept firm. If training needs to be rescheduled, rebooking fees will be charged to the client.
- B. Selection of the **training site** should be done by the client prior to SBB trainers' arrival and should respect the following criteria:
  - **ERS material easily accessible** and ready for the training upon the arrival of the SBB crew on site.
  - **Field training area** (minimum size of 50m x 50m) with a relatively flat natural ground exempt of trees, bushes or any obstacle which would slow down operations. Avoid marshy or rocky soils.
  - A **classroom** with projector and white board (or equivalent) for both field and software trainings.
- C. **Workers and expenses.** SBB will provide their trainers and will only cover their expenses. Customer or End user must provide field trainees / labors whom will bring the material and install the tower(s) under trainer's guidance and supervision. No other expense whatsoever (food, travel, lodging, equipment rental, labour, conference room rental, permits, etc.) will be covered by SBB (unless clearly specified in SBB's offer).
- D. **Unloading the material** from the containers and **erection of the towers** during field training will be performed by client's crew under the supervision of SBB trainers.
- E. **No additional material or equipment** other than the one listed in the Bill of Material (BOM) will be supplied by SBB for the specific purpose of the field training.
- F. In order to get efficient trainings, **only people** that will be **directly working with SBB ERS towers** should be selected to attend to field and/or software trainings.

- G. If the training occurs in a **remote area**, the client should provide the following:
- **Transportation** from the hotel to the site and vice-versa for the SBB training team.
  - **Meals** (breakfast, lunch and dinner).

**Typical field and software training schedule**

Field Training	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Arrival of SBB Trainers	x						
Theoretical presentation		x					
Preparation of material on the field		x					
Anchor installation			x	x			
Preparation for the erection			x	x			
Tower erection and guying			x	x			
Installation of the insulators			x	x			
Example of conductor stringing					x		
Dismantling of towers					x	x	
Bringing back the material in the containers						x	
Software training							
Introduction of ERS towers and software			x				
PLS-CADD LITE overview			x				
Exercises			x	x			
PLS-CADD POLE LW+MAST overview				x	x		
Exercises					x		
Exercises on both software and review					x		
Departure of SBB trainers							x



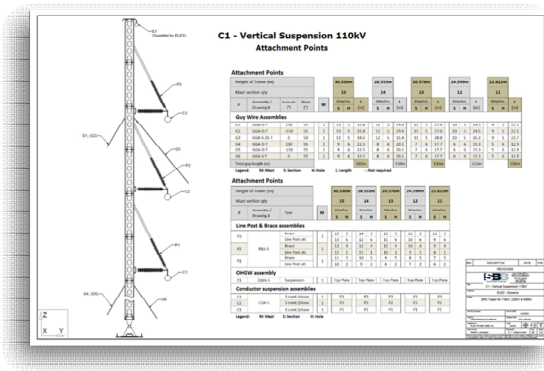
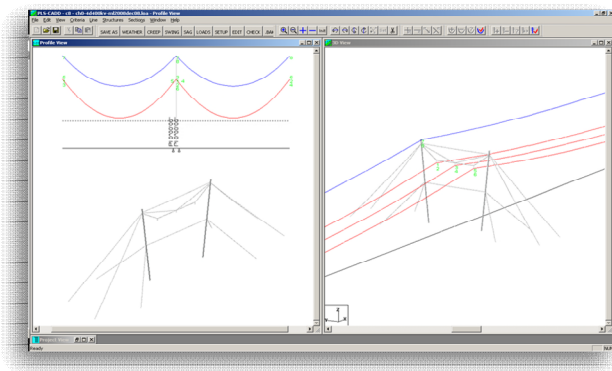


### Field Training Requirements:

- H. The client's field **crew** attending the ERS field training should consist of at least 6 people (4 labours and 2 linemen or riggers) and a **maximum of 12 people** (8 labours and 4 linemen or riggers).
- I. The crew shall be **fully efficient** in the erection of similar towers and used to climbing such heights.
- J. The training's schedule has been prepared with the objective of showing the necessary steps of several installation methods. **No performance should be expected** regarding a quantity of towers to be installed.
- K. SBB is **not responsible for time lost** due to poor weather conditions or due to the site not being ready for the training.
- L. **Equipment required** during Field Training and provided by the client (at his own fees):
  - Unleaded Fuel – for Portable Winch (EQU-PWIN) and other gasoline power units if any;
  - Oil for 4-stroke engine (SAE 10W-30 or equivalent) – for Portable Winch;
  - Oil for 2-stroke engine (synthetic) – for gasoline hammer / driller (EQU-COMB);
  - Anti-seize lubricant – for stainless steel bolt threads;
  - Lift truck to unload the boxes from the containers (if no storage system was provided);
  - Small excavator – to perform digging for permanent anchors during training;
  - Compactor – for permanent anchors;
  - Linemen should have their own harness (with a chest and back attachment points + positioning belt), hard hat and other personal safety equipment.

### Engineering and software Training Requirements:

- M. The client's crew attending the engineering and software training should consist of **between 1 to 6 engineers / technicians** familiar with computers and with concepts related to transmission lines.
- N. **Computers** for trainees will be **provided by client** and should be ready for software installation.
- O. Training is given on **PLS-CADD LITE / PLS-POLE LW-MAST** programs.
- P. A **maximum of 2 people per workstation** is allowable.



For further information, please contact us at [info@sbb.ca](mailto:info@sbb.ca).