



Fiji Electricity Authority
Transmission Unit
2 Marlow Street, Suva

ADDENDUM # 1

TENDER NO: MR90/2017

**DESIGN, MANUFACTURE AND SUPPLY OF STEEL UTILITY POLES FOR
TRANSMISSION LINES**

REVISED TENDER CLOSING: 16:00hrs (UTC +12) on Wednesday, 21ST JUNE, 2017



Table of Contents

1. Standards Applicable for this Tender.....	3
2. Service Conditions.....	4
3. Design and Construction Features.....	4
a. Dynamic Wind Loading and Static Span Loading.....	5
b. Topographical Boundary Conditions.....	5
c. In Ground Corrosion Protection.....	5
d. Type of Mounting.....	5
e. Cross Arms.....	6
f. Pole Caps.....	6
g. Mounting Holes.....	6
h. OPGW Extensions.....	6
c. Quality Control.....	7
d. Service Conditions.....	Error! Bookmark not defined.
e. Tools and Equipment.....	7
f. Warranty.....	7
g. Factory test at manufacturer’s work site for approvals.....	8
h. Manufacturer’s Qualification.....	8
i. Prices and Quantity Required.....	8
j. Payment Terms.....	8
k. Submission of bid documents.....	Error! Bookmark not defined.



REVISED TENDER CLOSING: 16:00hrs (UTC +12) on Wednesday, 21ST JUNE, 2017

TENDER DOCUMENT AND SPECIFICATIONS

The Fiji Electricity Authority invites sealed tenders from reputable companies with the relevant experience, for the design, manufacture and supply of tapered steel poles manufactured as per the required standards, to be used in overhead Transmission Lines by FEA.

TECHNICAL SPECIFICATIONS FOR STEEL UTILITY POWER POLES

1. Standards Applicable for this Tender

The primary standard got design, manufacture, testing, handling and transportation shall comply with **AS4677:2010 – Steel Utility Service Poles**.

Other relevant standards, but not limited to:

AS1170.2-2002	Structural Design Actions (Wind Actions)
AS/NZS4676-2000	Structural design requirements for utility service poles
ASCE 48 – 11	Design of Steel Transmission Pole Structures
AS 1214	Hot – dip galvanizing coatings on threaded fasteners
AS 4360	Risk Management
AS/NZS ISO 9001	Quality Management Systems - Requirements

Note: Bidders shall demonstrate/submit proof of ownership and possession of aforementioned standards.

2. Drawings

Refer to Appendix for drawings of existing FEA Wooden Pole Structures that shall give the bidders a fair understanding about the scarfing details on each type of the following poles. The design for the steel poles shall be in accordance with the drawings attached.

- a. Three Pole – Heavy Strain (Tension)
- b. H-Pole Regular Suspension – Single Circuit
- c. H-Pole Heavy Suspension – Single Circuit

- d. H-Pole Regular Strain (Tension)
- e. H-Pole Heavy Strain (Tension)
- f. Single-Pole Regular Suspension
- g. Single-Pole Heavy Suspension
- h. Single-Pole Heavy Strain (Tension)
- i. Single Pole Wish-Bone Structure
- j. Single Pole Cantilever (Post) Insulators
- k. Single Pole Cantilever (Post) Insulators

2. Service Conditions

The steel poles shall be exposed to the following environmental conditions:

- a. Rural Weathered
- b. Ambient Temperature: 10°C (Winter Night) to 40°C (Summer Noon)
- c. Solar Radiation Intensity: 0 to 1000W/m²
- d. Ground reflectance of 0.2
- e. Emissivity of 0.5 for rural weathered conductor up to 0.85 for industrial weathered conductor
- f. Solar absorption coefficient of 0.5 for rural weathered conductor or 0.85 for industrial weathered conductor
- g. Wind Speeds for Sag and Ampacity Calculation (Boundary Cases)
 - I. Maximum 2m/s in Winter Night (10°C)
 - II. Minimum 0m/s in Summer Noon (35°C)

3. Design and Construction Features

All design and construction, methodology shall strictly comply with the above specified referenced documents, or any other relevant international standard.

The following information is provided as guideline:

	Length (m)	Tip Strength (kN)	Design Mass(kg)	Tip Diameter (mm)	Base Diameter (mm)	Pole Top Point Maximum Loading (kN)	Ultimate Tensile Strength (kN)
Steel Tapered Poles	15.5	40	2270-3810	360	600	24	50
	17						



a. Dynamic Wind Loading and Static Span Loading

The steel poles shall be able to carry load of the below mentioned heaviest conductors and shall be able to bear their Static Span Loading and Dynamic Wind Loading:

Conductor Codename	Grape	Lime	Neon
Nominal Overall Diameter mm	17.5	24.5	18.8
Cross – sectional Area mm ²	182	356	210
Approximate Mass kg/km	677	1320	576
Breaking Load kN	63.5	122	47.8
Modulus of Elasticity GPa	88	88	65
Coefficient of Linear Expansion 10 ⁻⁶ / °C	18.4	18.4	23.0
Wind Speeds	Category 5 Cyclone (Refer to AS/NZS 4000)	Category 5 Cyclone (Refer to AS/NZS 4000)	Category 5 Cyclone (Refer to AS/NZS 4000)

b. Topographical Boundary Conditions

The poles shall be designed in order to remain solid even when stressed to the following limits:

- Maximum Vertical Height Difference between Poles: **85m**
- Maximum Horizontal Separation Between Poles: **600m**

c. In Ground Corrosion Protection

All the steel poles shall be hot dip galvanized smoothly as per IEC (as amended up to date). The coating on the metal parts shall be at least 120um galvanising and should have a service life of 50 years. The coating shall be as per IEC-168, thus having a single hot dip galvanized finish.

d. Type of Mounting

The bidder shall provide designs or both In – Ground mounted as well, as Base Plate mounted Steel Poles. This means that the poles shall also be suitable for direct installation in soil/rock without any concrete foundation. The poles shall be able to be mounted in the following soils that have distinct safe bearing capacities:

Type of Soil	Maximum Safe Bearing Capacity (kg/m ²)
Soft, wet clay or muddy clay	5000
Soft clay	10000
Fine, loose and dry sand	10000
Black cotton soil	15000



Moist clay and sand clay mixture	15000
Loose gravel	25000
Medium clay	25000
Medium, compact and dry sand	25000
Compact clay	45000
Compact sand	45000
Compact gravel	45000
Soft rocks	45000
Laminated rock such as sand stone and Lime stone	165000
Hard rocks such as granite, diorite , trap	330000

e. Cross Arms

The bidder shall specify the type of cross arms (timber, steel, composite) that can be mounted to the steel poles and the methodology as well as any other additional equipment or modifications required for these mountings. The place of mounting of the cross arms on to the poles is shown on the existing FEA Wooden Poles drawings attached in the Appendix section.

f. Pole Caps

- All the Steel poles shall have a welded Pole Cap that shall have a minimum tensile strength of 450 MPa.
- The Pole Cap shall be made from Grade 250 equivalent steel.

g. Mounting Holes

- The mounting Holes shall be as per the specifications and designs of the Steel Poles provided by FEA.
- All steel poles shall be supplied with mounting holes.
- Methods and procedures must, however be submitted for drilling the mounting holes

h. OPGW / Earth wire Extensions

The steel poles must come with a provision for OPGW extensions on the top. The steel poles shall be able to carry load of the OPGW conductor whose specifications are provided below and the poles shall be able to bear their Static Span Loading and Dynamic Wind Loading:

Wire Type	OPGW/Earth wire
Stranding & Wire Diameter no./mm	7/3.25



Fiji Electricity Authority

Transmission Unit

2 Marlow Street, Suva

Nominal Overall Diameter mm	9.75
Cross – sectional Area mm²	50
Ultimate Tensile Strength kN	6000
Breaking Load kN	6000
Modulus of Elasticity kN/mm²	150
Coefficient of Linear Expansion 10⁻⁶/ °C	13.2
Wind Speeds	Category 5 Cyclone (Refer to AS/NZS 4000)
Electrical Resistance at 20 Degrees Celsius Ohm/km	1 ohm per km

c. Quality Control

A production drawing shall be provided for each type of pole designed and manufactured, and a quality control technician shall approve each stage of manufacture before proceeding to the next. Steel Loading tests shall be performed for each pole in the required manner. A final quality control check shall be carried out on each pole after the manufacturing is completed. All quality control procedures shall be mandated in a written manual and be available for inspection.

In addition, the manufacturer shall be ISO 9001-2000 and ISO 14001-2004 certified and shall maintain a development and engineering department to provide a technical after sales service and information related to the steel poles.

d. Tools and Equipment

The tenderer shall forward a list of tools and equipment required for safe operation and maintenance of the installation and includes the cost of supplying such tools and equipment as part of the tender submission.

e. Warranty

The Contractor shall provide warranty for the steel poles for a Period of twelve [12] months after delivery of the Poles. For all Steel Poles supplied by third-parties, the contractor is to ensure that the warranties of these Poles are transferred to FEA as the beneficiary. The Contractor warrants to the Employer that all Works performed and completed in respect of the Warranted Works are in accordance with the standards and quality specified in the Contract or if not otherwise specified, the work is according to good trade practice expected in the energy industry.



f. Factory test at manufacturer’s work site for approvals

All required testing shall be carried out in accordance to the procedures outlined in the referenced documents. Certified copies of all test results shall be submitted by an independent accredited testing authority at an accredited testing facility.

It is also mandatory requirement for two (2) FEA Engineers to be present at the manufacturer’s site to witness the factory tests being carried out in accordance to the required standards:

Manufacturer to advise FEA when conducting a Factory Test

g. Manufacturer’s Qualification

Manufacturer shall have sufficient designing, supplying and manufacturing experience of steel utility poles for at least ten (10) years for the required work specifications. As proof, the manufacturer shall submit a supply-list indicating type of steel pole, quantity supplied, name of client and the year of delivery. Certificates from customers with satisfactory usage shall be provided with the supply record. Steel Poles shall be considered, for which a minimum 5 years manufacturing and successful service experience is available, without change of basic design and material. The qualified manufacturer shall have designed, manufactured, tested and supplied at least 3,000 units of similar Steel Utility Poles for the same work specification.

h. Prices and Quantity Required

Prices shall be quoted in Fijian Dollar Currency, inclusive of all taxes, customs, clearance charges, and duties payable in Fiji and for delivery to **FEA’s Kinoya/Navutu Depot**.

SCHEDULE OF QUANTITIES AND BIDDER’S PRICES	
ANTICIPATED QUANTITY REQUIRED	200
BIDDER’S UNIT PRICE (VIP) {Including Delivery to FEA Kinoya/Navutu Depot}	
BIDDER’S LUMP SUM PRICE (VIP) {Including Delivery to FEA Kinoya/Navutu Depot}	

Bidders to utilize the above table to submit prices.

Prices shall be valid for at least 90 calendar days, from the closing date of this tender.

i. Payment Terms

FEA’s standard 30 days payment policy upon delivery of goods and services applies. Bidder’s to explicitly note all exceptions and/or reservations to the same if any.

APPENDIX: FEA 33kV Transmission Line Existing Wooden Pole Details

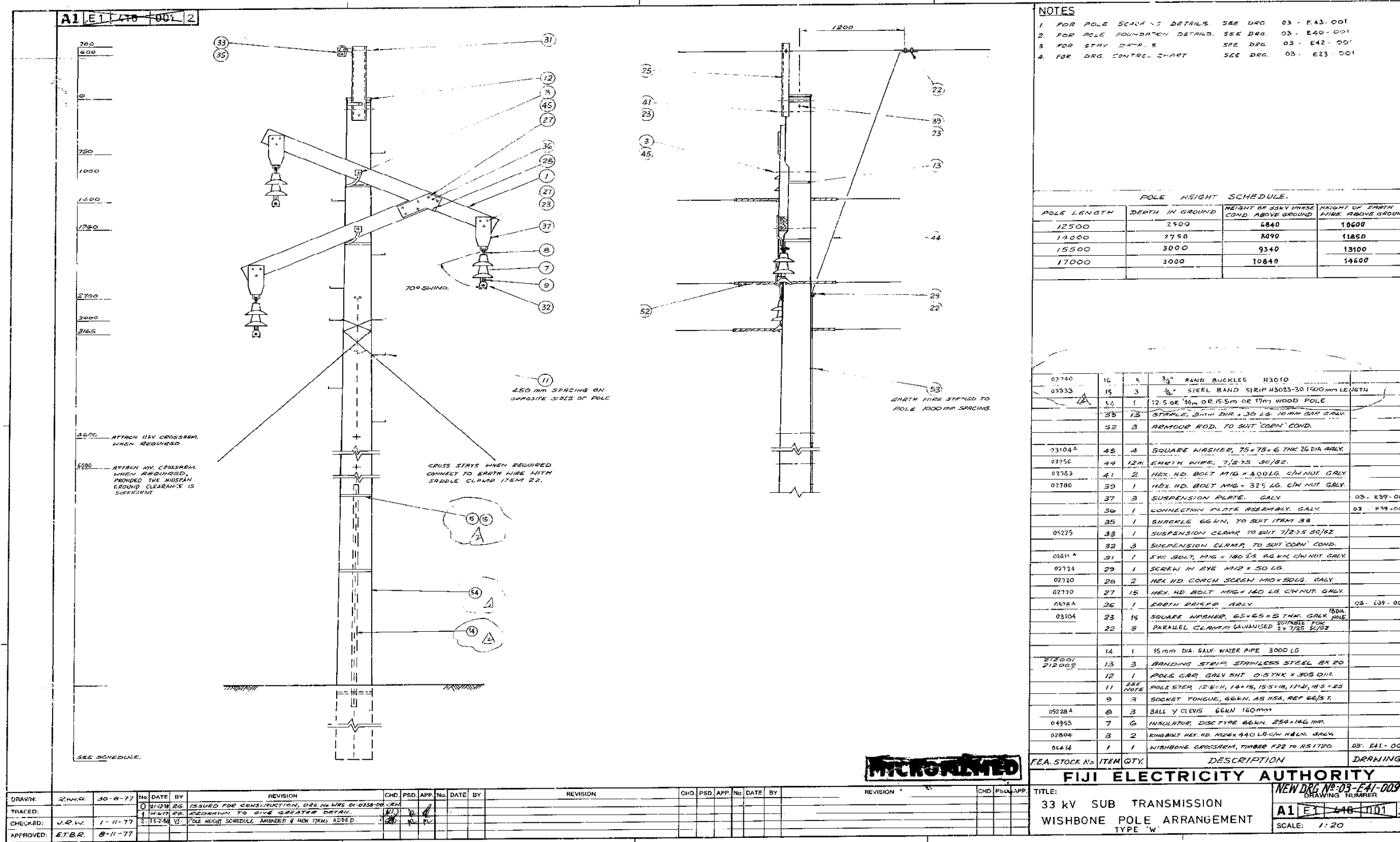


Figure 1: 33kV Wishbone Pole Arrangement

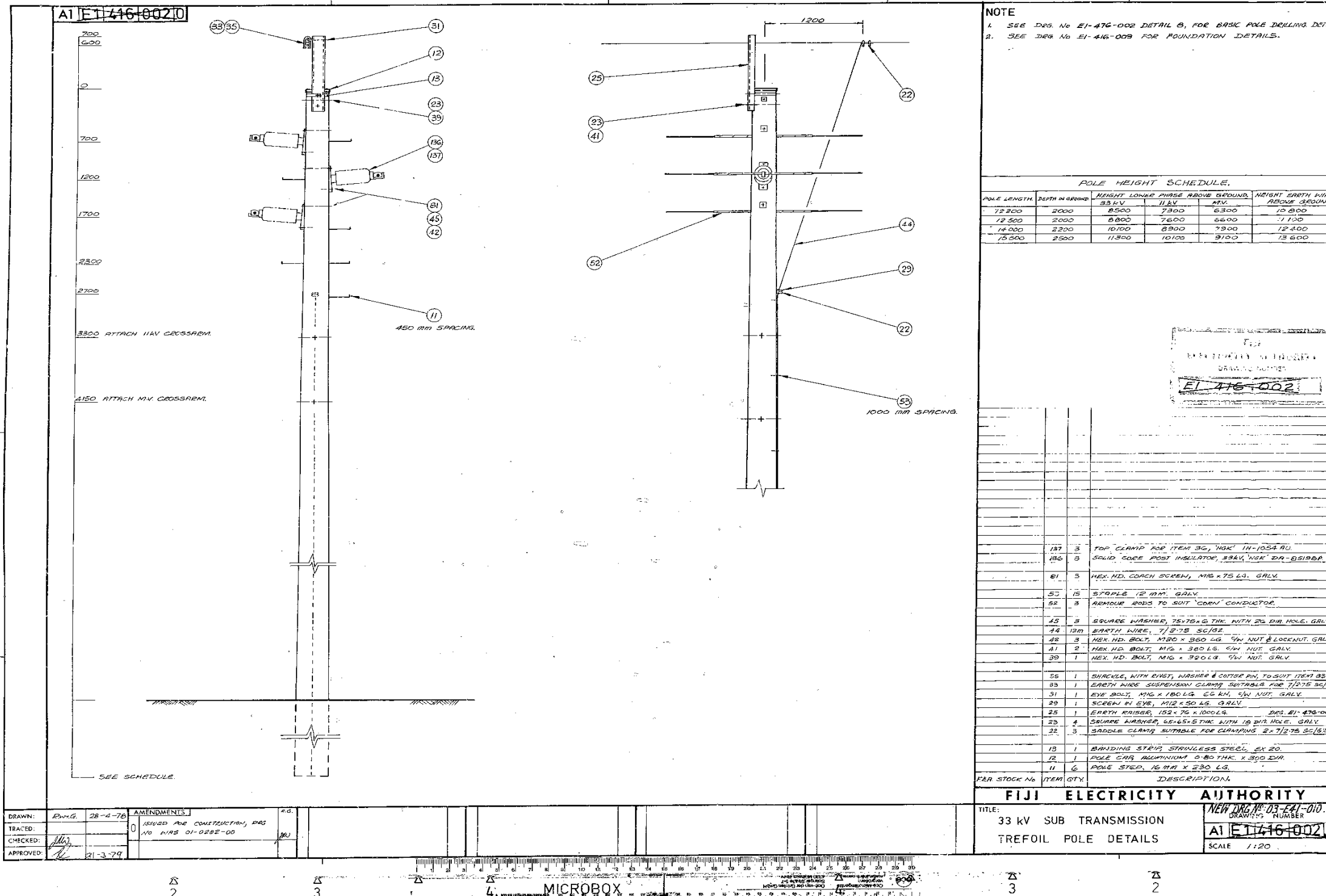


Figure 2: 33kV Single Pole Suspension – Post Insulators

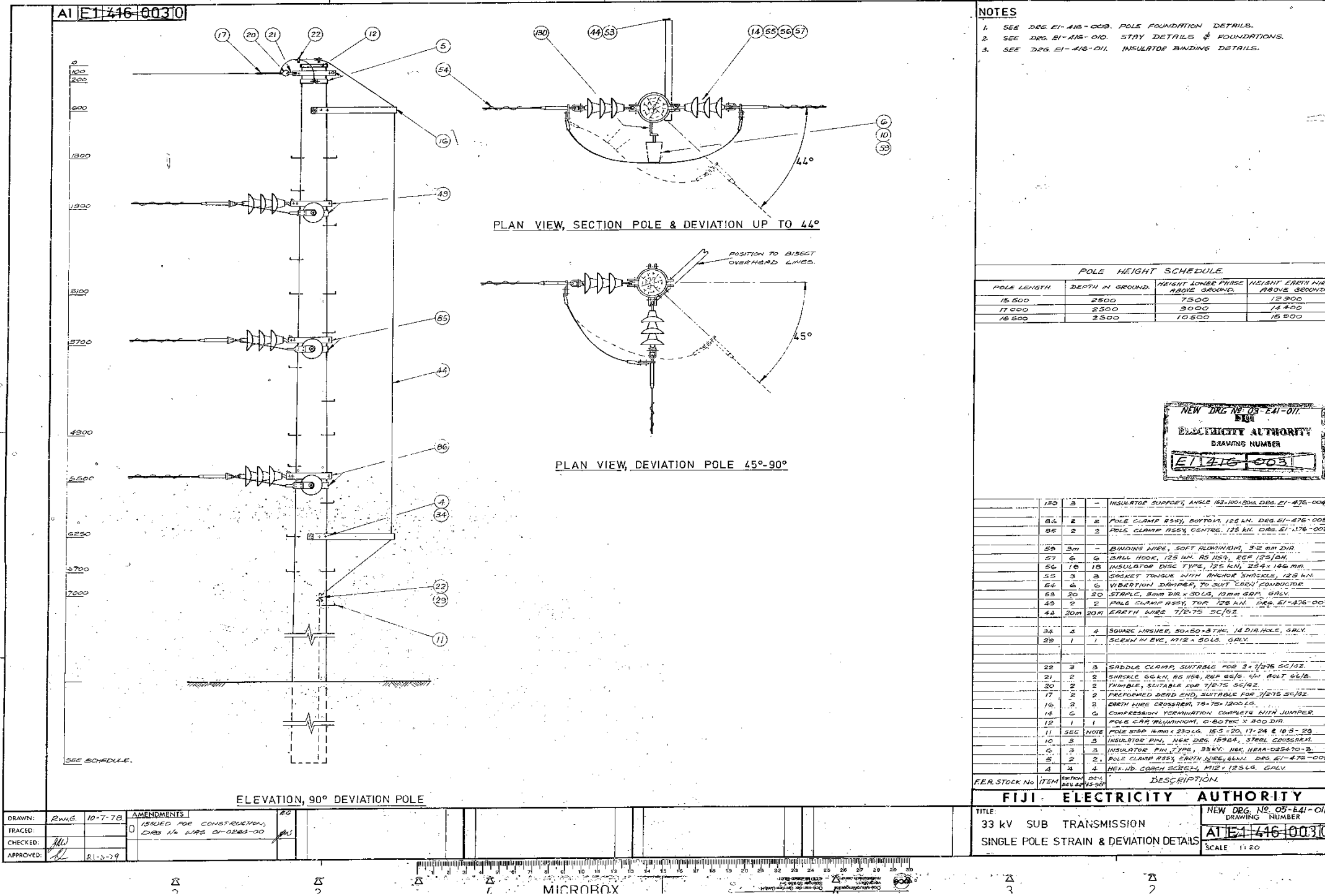


Figure 3: 33kV Single Pole Strain - Post Insulators

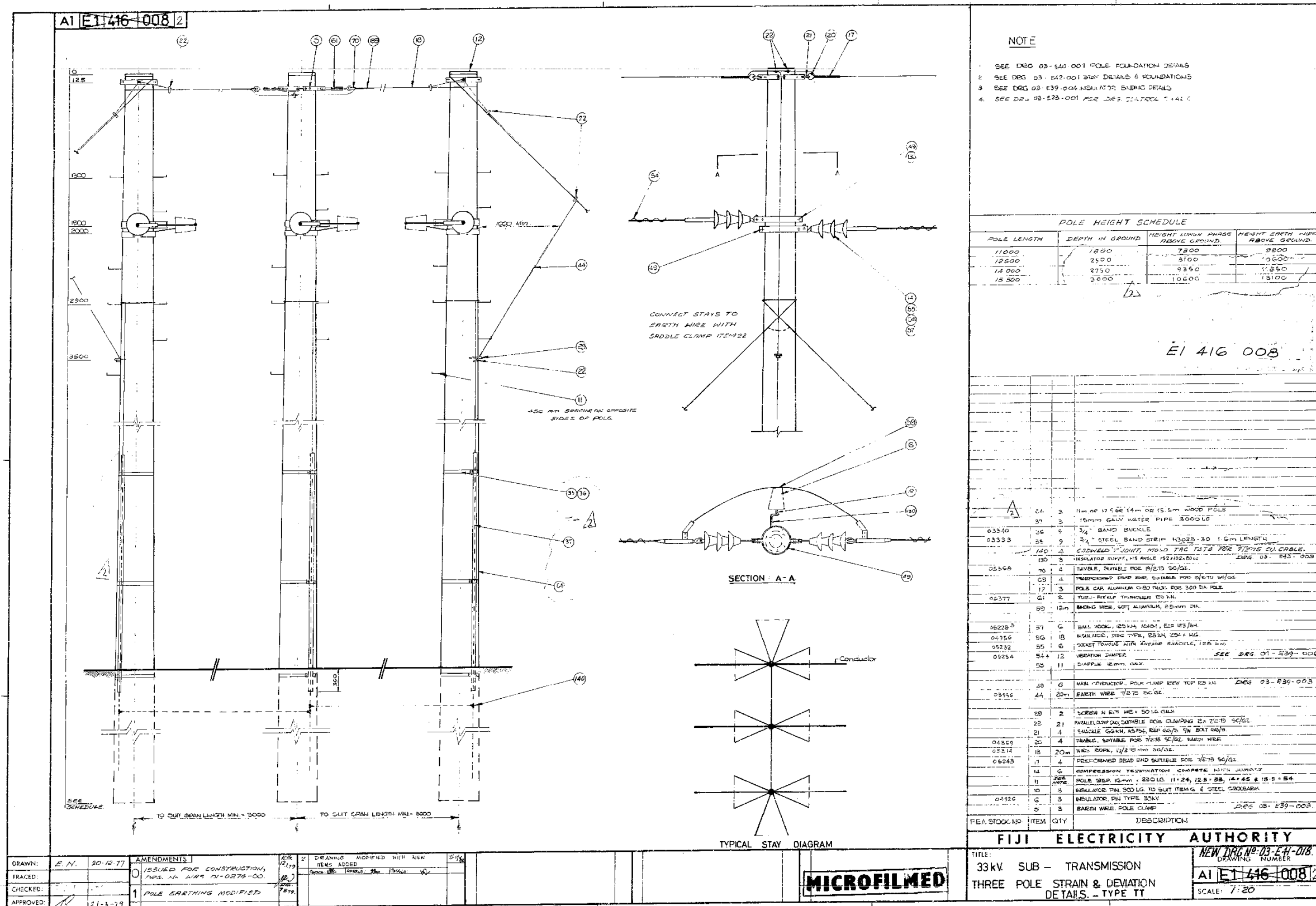


Figure 4: 33kV Three Pole Strain Details

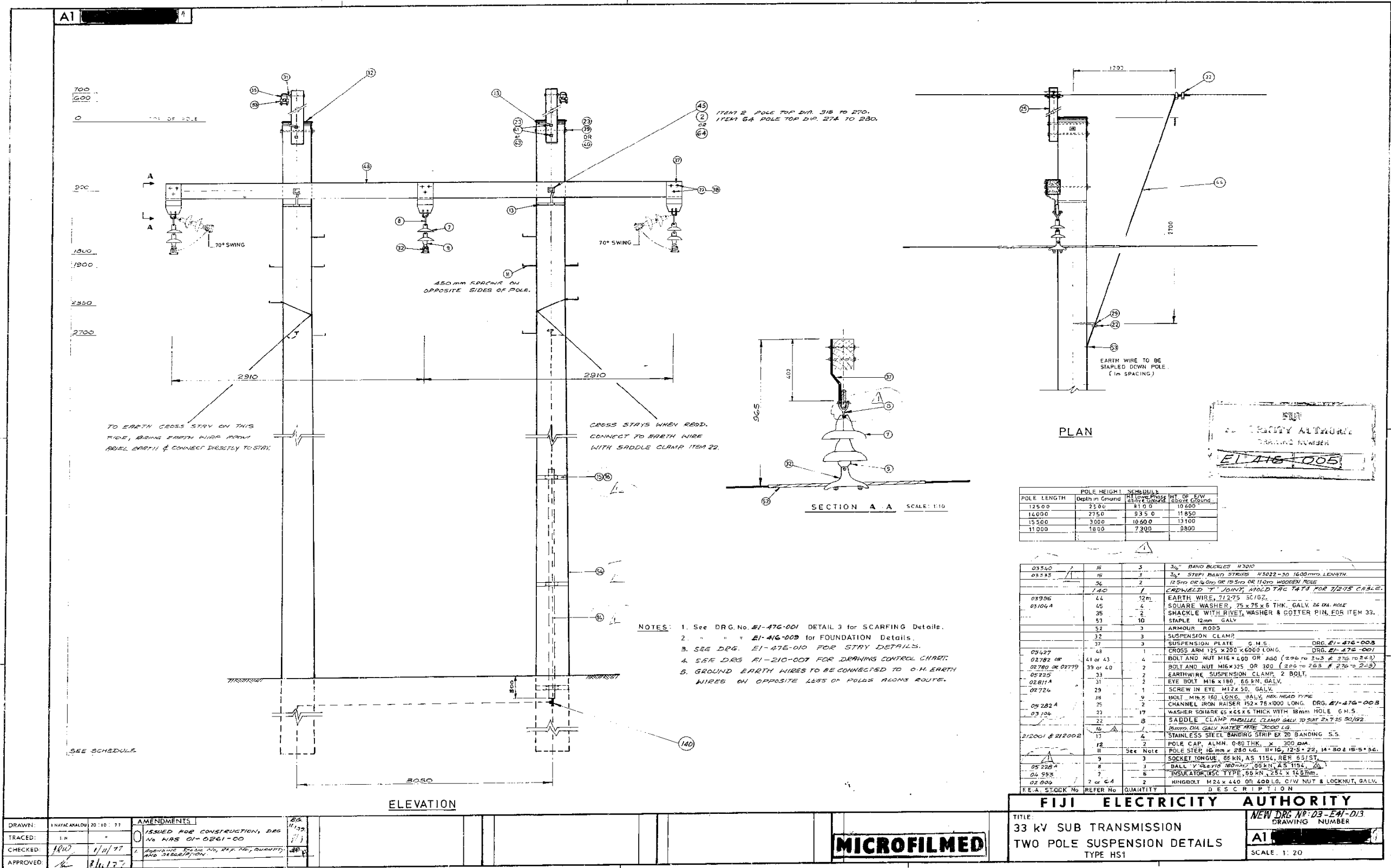


Figure 5: 33kV Two Pole Suspension Details

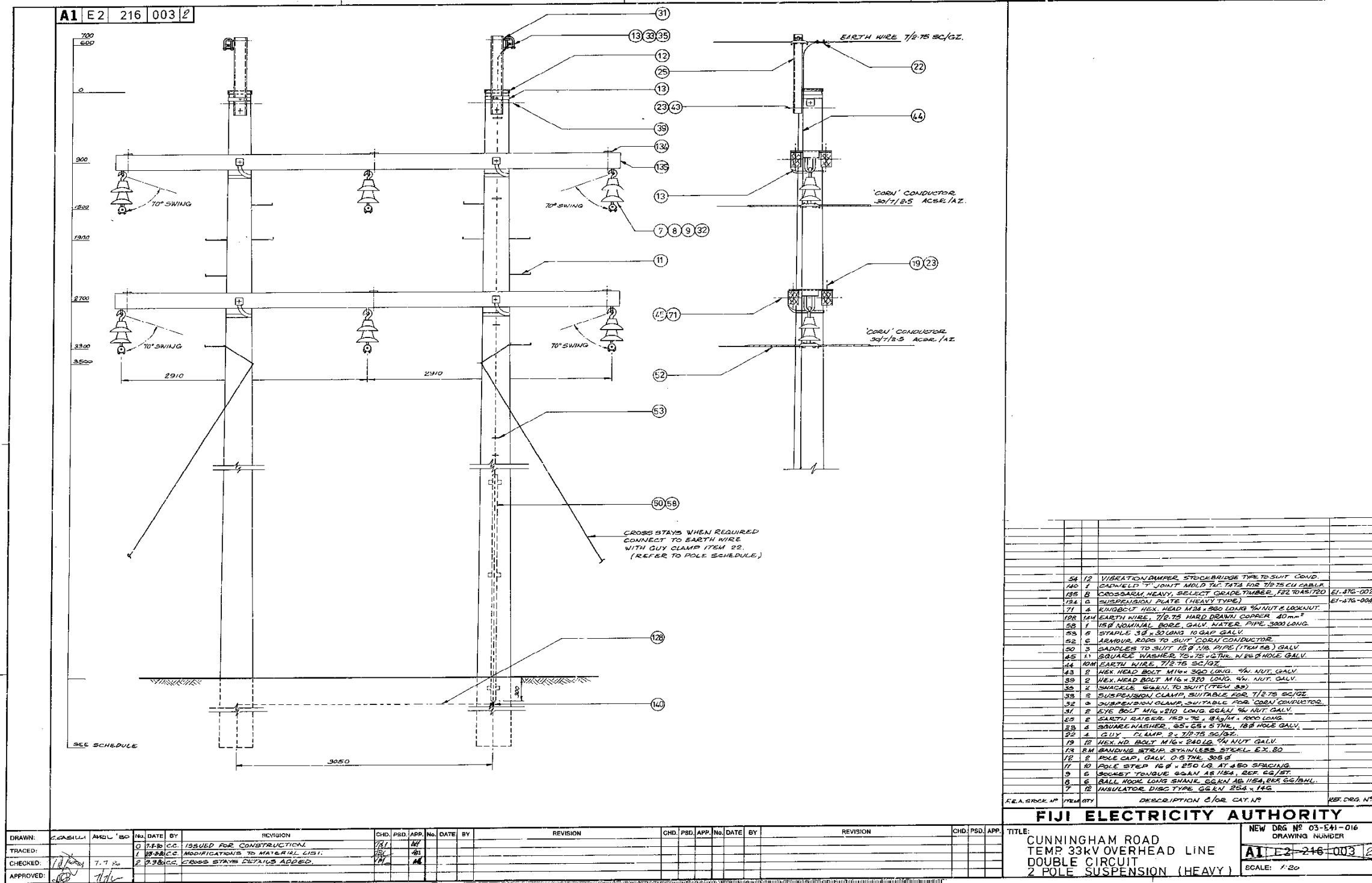


Figure 6: 33kV Two Pole Heavy Suspension Details

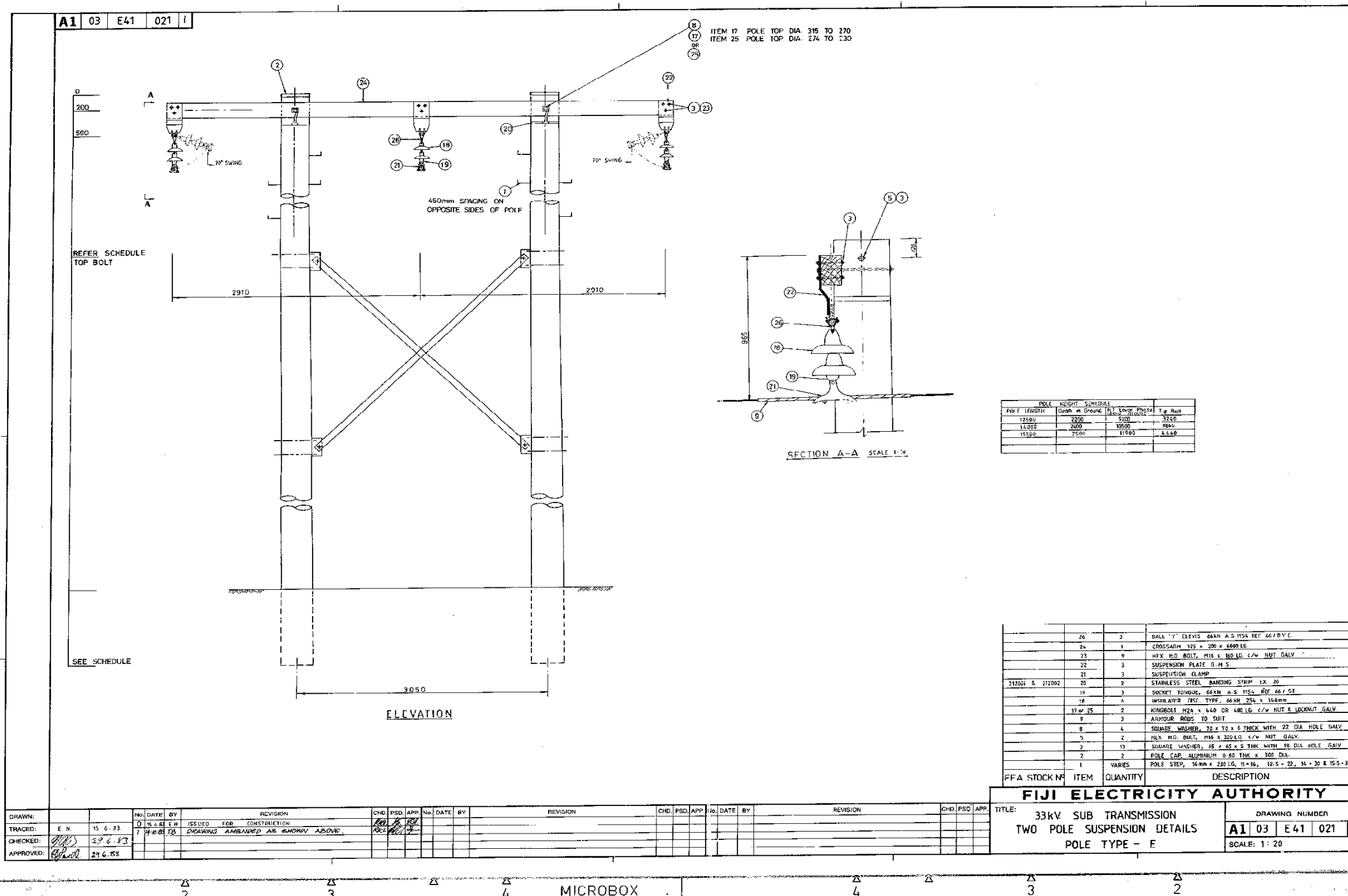


Figure 7: 33kV Two Pole Strain with Brace Details

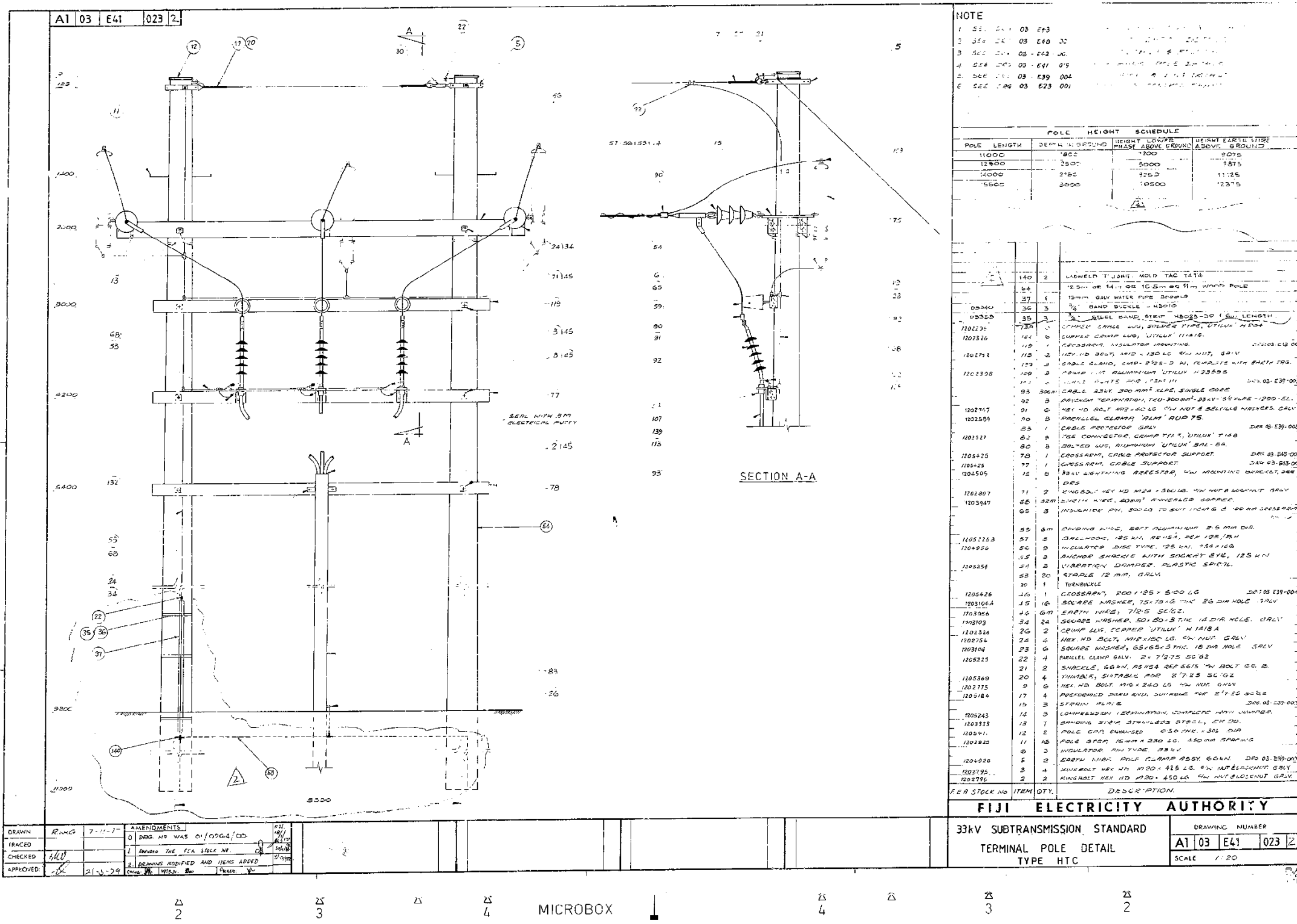


Figure 8: 33kV Termination Pole Details

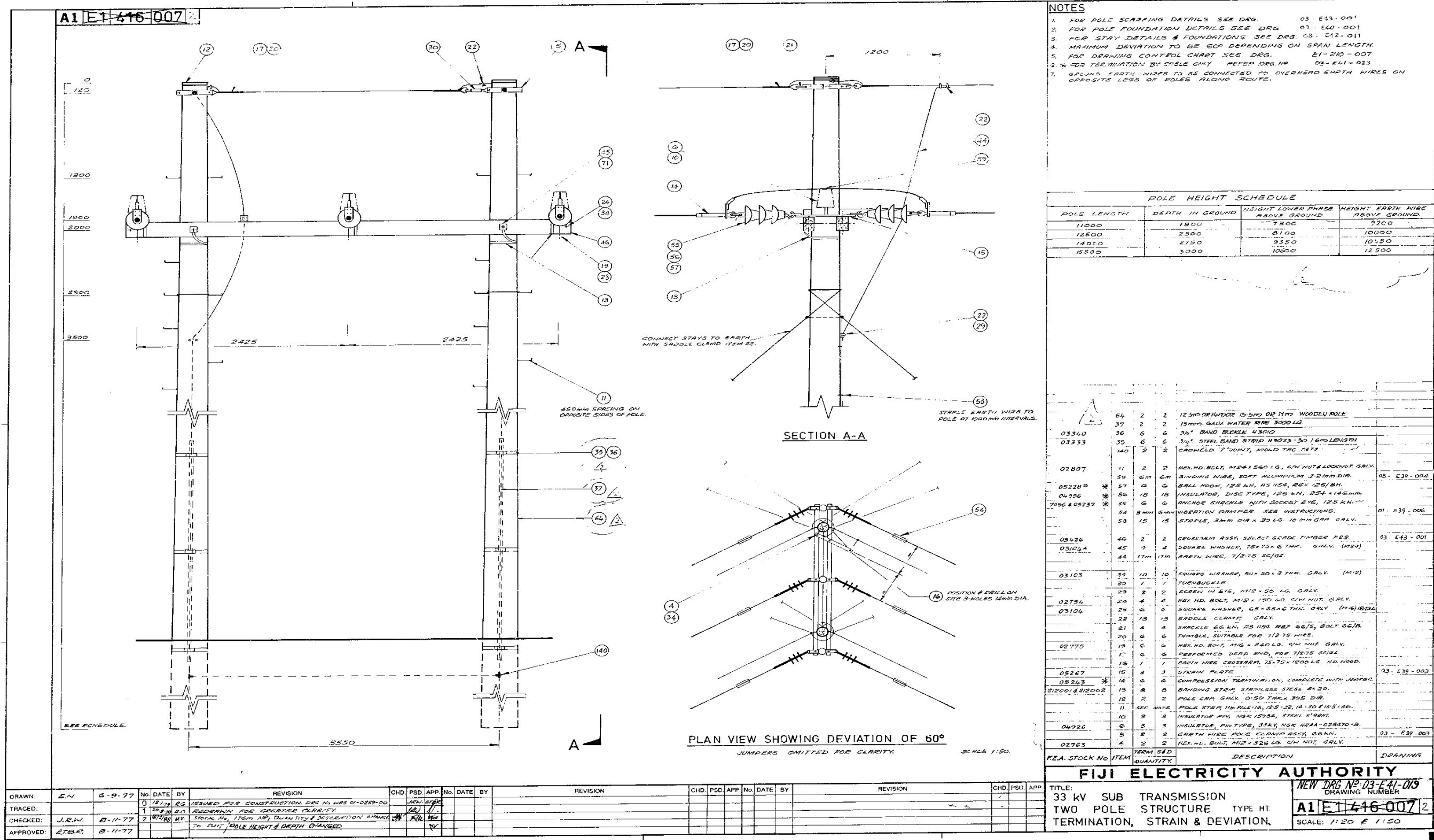


Figure 9: Two Pole Regular Strain with Earth wire/OPGW

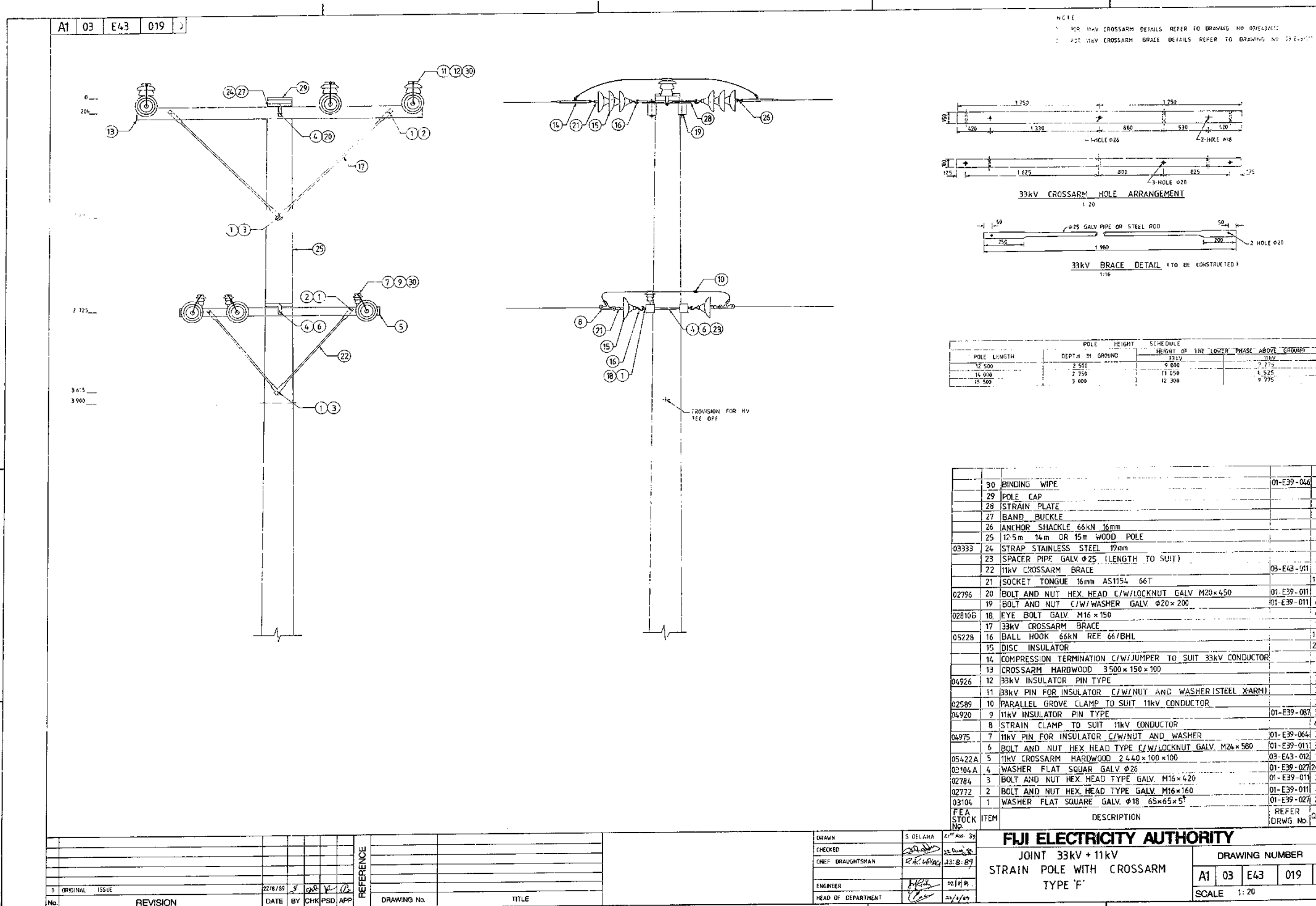
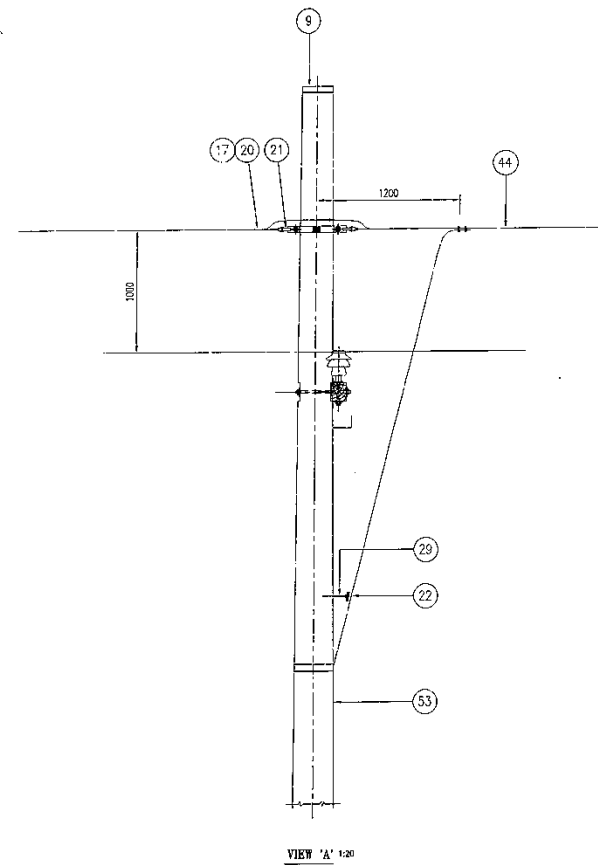
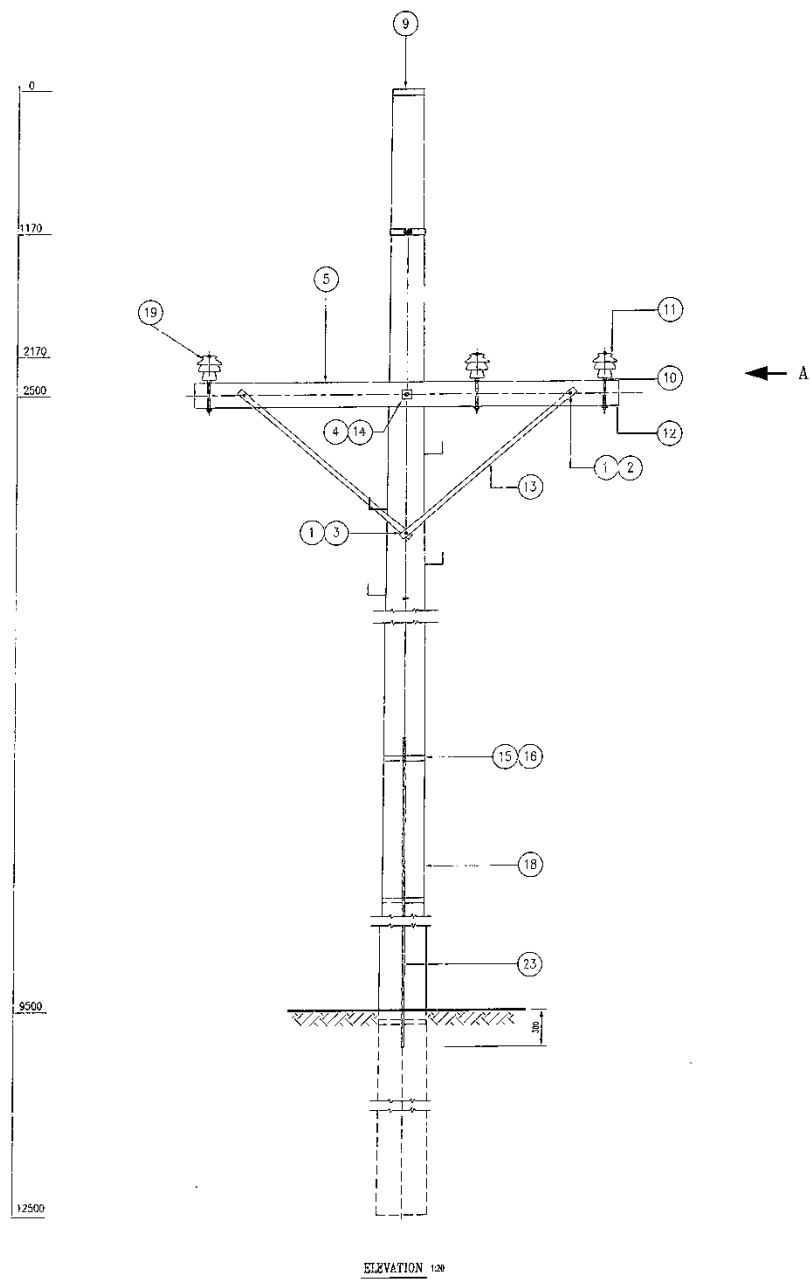


Figure 10: Single Pole Strain

AI 03 E43 034



NOTE

1. Use the above design on pole no 14.
2. Use double crossarm with double pin insulator of similar design on pole no 13.

VEN STOCK NO	ITEM	DESCRIPTION	RRP DPG	QTY	QTY (Overall)
	54	Spacer pipe galv. dia 25 (Length to suit)		2	2
	53	Single 1.0mm. wire		6	6
03954	44	Earth wire 1/2" dia. 50/72	13m	13m	13m
	20	Screw in eye bolt - M12 x 50 long galv		1	1
	23	15 dia galv. anchor plate x 3000 long		1	1
	21	15 dia galv. anchor plate x 3000 long		1	1
	22	15 dia galv. anchor plate x 3000 long		1	1
	21	Box stock 60x60 x 1156, mt. 66/5, bot. 688		2	2
	20	Handle suitable for 7/2.75 wire		2	2
01689	16	Soft aluminium lifting eye	01 - E30 - 046	1	1
	18	12.5mm wooden pole (only for pole 13 & 14)		1	1
	17	Professional wood made for 7/2.75 50/72		2	2
03340	16	1/4" hard bakelite 3010		3	3
03333	15	3/4" steel hard strap H3022 - 30 x 100mm long		3	3
02986	14	Bolt and nut hex head type 2/w locknut galv 8020 x 450 long 01 - E39 - 011		1	1
	13	33w crossarm beam		2	2
05429	12	Crossarm bracket 150 x 150 x 3500 long		1	1
04926	11	33w insulator pin type		3	6
04697	10	33 pin for insulator 2/w nut & washer		3	6
	9	Pole cap	01 - E39 - 008	1	1
	8	Bolt and nut hex head type 2/w locknut galv. M24 x 180		1	1
03104	4	Weather flat anchor plate 25 dia x 75 x 75 x 6 thick	01 - E39 - 002	2	2
02784	3	Bolt and nut hex head type 2/w locknut 816 x 450	01 - E39 - 011	1	1
02772	2	Bolt and nut hex head type 2/w locknut 816 x 160	01 - E39 - 011	2	2
03104	1	Weather flat anchor plate 18 dia x 55 x 55 x 5 thick	01 - E39 - 007	6	6

No.	REVISION	DATE	BY	CHK	PSD	APP	REFERENCE	DRAWING No.	TITLE
0	ORIGINAL ISSUE	2/11/95	ABA						

DRAWN	ABAKAFA	22-11-95	FIJI ELECTRICITY AUTHORITY	
CHECKED			33 KV SUB TRANSMISSION	
CHIEF DRAUGHTSMAN			SPECIAL TYPE 'G' FOR POLES 13 & 14	
PLANNING TECH.			VUDA-WAQADRA 'B' LINE-FINAL SECTION	
ENGINEER			SCALE: 1:20	
HEAD OF DEPARTMENT			DRAWING NUMBER	

Figure 11: Single Pole Suspension