Version 1, May 2026

Utility Pole Field Drilling Manual

Wagners Composite Fibre Technologies (CFT)

WAGNERS

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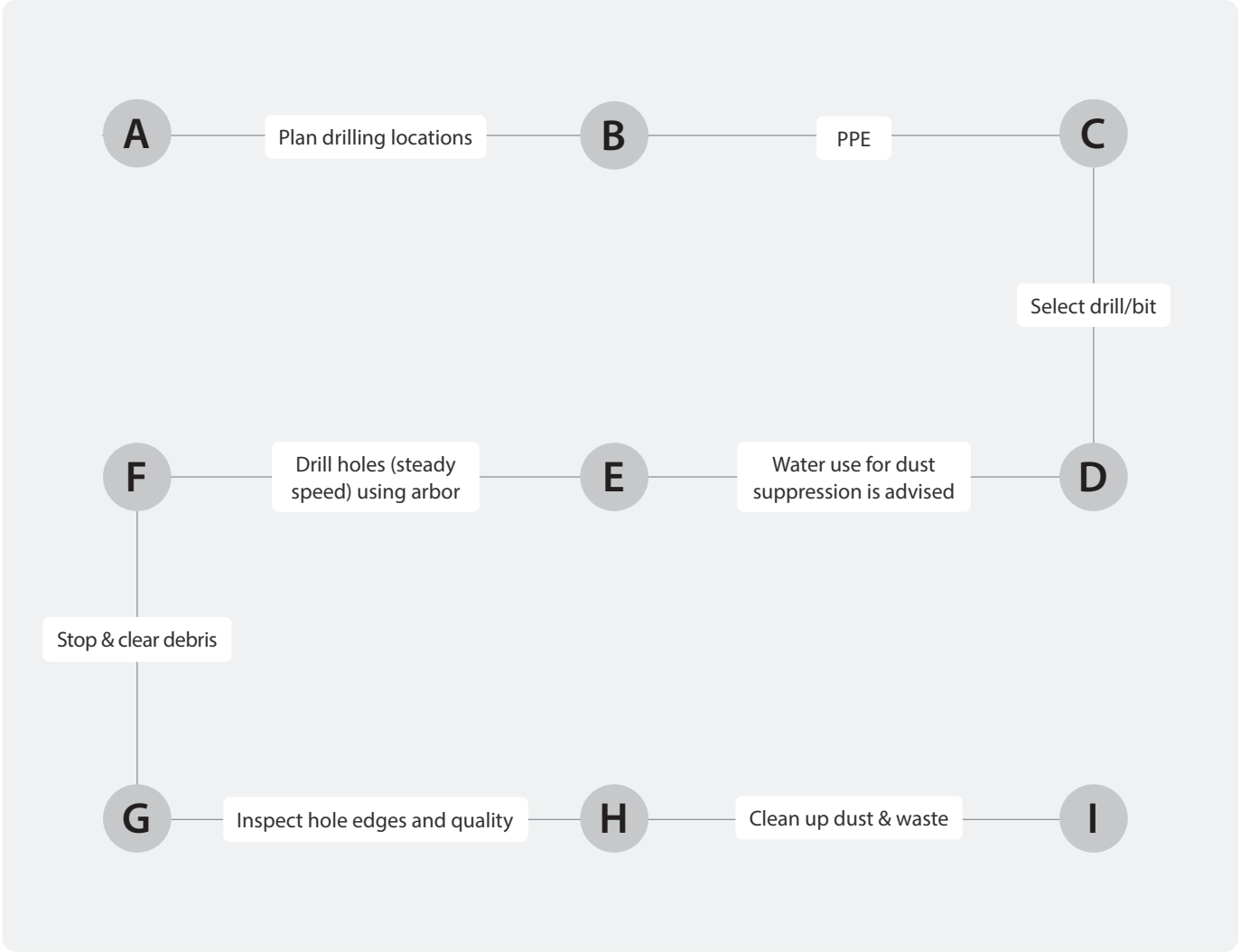
Introduction

This guide covers safe field drilling of glass fibre reinforced polymer (GFRP) utility poles made with vinyl ester resin. It emphasises practical steps and personal protective equipment. Key points include wearing respirators and clothing, using the right drill bits, supporting the pole, controlling dust, and recognising hazards (fire, electrical, fall, kickback).

***Figure 1** - Predrilled Wagners Pole*

Drilling Workflow

Wagners Composite Fibre Technology (CFT) poles are typically pre-drilled to accommodate pole steps and other hardware as requested. However, if the on-site field drilling is needed, the proposed and simplified flowchart of the drilling process includes the following steps:



3.0

Personal Protective Equipment (PPE)

Before drilling, crews should use appropriate PPE. Recommended PPE is described in the following sections.

3.1 Respiratory

Although OSHA considers fibreglass dust non-toxic, it can still irritate the lungs. Always wear a fitted NIOSH dust mask (N95/P2) or better (P100) when drilling. In heavy dust or enclosed spaces, use a half-mask or powered respirator with P100 filters.

3.2 Eye and face

Wear safety glasses or goggles. For large bits or hole saws, add a face shield against flying debris.

3.3 Hands and skin

Wear gloves to prevent fibre splinters. Long sleeves and pants protect your arms and legs from sharp fibres. Avoid touching your face. After work, wash exposed skin to remove any stray fibres.

3.4 Hearing protection

Drilling can be loud (>85 dB). Use earplugs or earmuffs as required by site safety rules.

3.5 Other

Always wear a hard hat and safety boots. When climbing poles, use a full-body harness and fall-arrest gear. Secure tools and materials so they cannot fall on others.

***Figure 2** - Drilling on the pole*

Recommended Tools and Drill Bits

4.1 Drill bits

High-speed steel (HSS) twist bits will cut GFRP but blunt quickly due to the glass. Diamond-tipped bits are strongly recommended.

4.2 Hole saws/ core drills

Use of diamond-coated hole saws is strongly recommended.

4.3 Speed

Use moderate speeds (e.g. 300–1000 rpm, slower for larger bits) and a steady feed.

5.0

Drilling Technique and Bite Control

5.1 Setup

Secure the pole so it cannot spin or fall.

5.2 Orientation

Keep the drill perpendicular to the pole surface for clean holes.

5.3 Starting the hole

Engage the drill at low speed to start, then ramp up while applying steady pressure and avoid sudden thrust that could catch fibres.

5.4 Feed rate

Use moderate feeding pressure. Too rapid a feed causes excessive thrust force; too slow or high-speed causes heat.

5.5 Exit/Break-through

As you approach the hole exit, slow down and lighten the feed to minimise chipping.

5.6 Hole distance

As per ASCE/SEI 74-23, the minimum required spacing between the holes in each pole's direction should be 4 times the hole diameter ($4d_{hole}$). For instance, when the hole size is 26 mm, the minimum required spacing is 104 mm.

***Figure 3** - Pole specimen with bolt holes spaced at $4d_{hole}$*

5.7 Rotational Angle

To drill into an intact pole, locate the pole's seam line. This line marks where the dyes meet during pole manufacturing. Drill the first hole while the pole is fixed. To drill a second hole at a 90-degree angle to the first, use the measuring tape to mark a distance equal to the pole's circumference divided by 4. For instance, for 301CHS, the circumference is 945 mm, so the mark should be 236 mm from the centre of the reference hole. For 356CHS, this length is 279 mm.

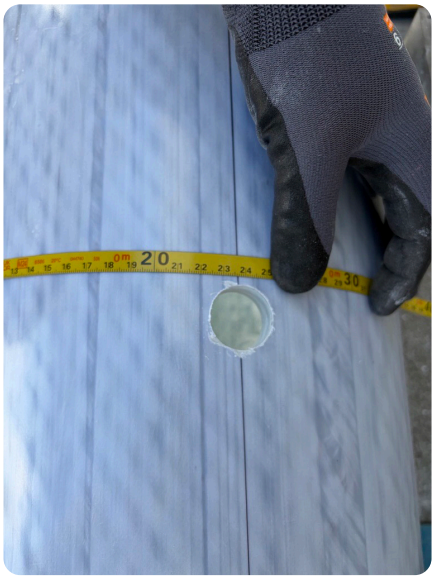


***Figure 4** - Drilling for rotational angle and hole distance*

6.0

Dust Exposure and Control

Drilling a GFRP pole generates dust of resin and glass fibres. This dust is mostly inhalable nuisance dust; studies show FRP fibres break perpendicularly and remain >6 µm, so they are not deeply respirable. OSHA classifies it under PNOR. OSHA PEL is 15 mg/m^3 (total) and 5 mg/m^3 (respirable) for PNOR. The ACGIH TLV for continuous filament glass is 1 fibre/cm^3 respirable or 5 mg/m^3 inhalable. However, any airborne dust can irritate eyes, skin and lungs. Some recommended practices include:

- **Monitor exposure:** If drilling in confined spaces or many holes, consider air monitoring (NIOSH 0500).
- **Local control:** Use wet drilling (coated bits that carry water, or mist spray or shaving foam) to trap dust at the source.
- **Personal protection:** At minimum, wear a fitted N95/P100 respirator. The ACMA advisory even suggests a "particle mask" with NIOSH marking for composite pole work. Ensure respirator seal test for each wearer. A full facepiece respirator may be used if the dust is heavy.
- **Ventilation:** Whenever possible, drill outdoors or in well-ventilated areas. Position so that wind or fans blow dust away from personnel.
- **HEPA vacuum:** After drilling, vacuum all dust with a HEPA-filtered shop vacuum. Wet wipes for surfaces and tools can be useful. Proper housekeeping prevents secondary exposure.

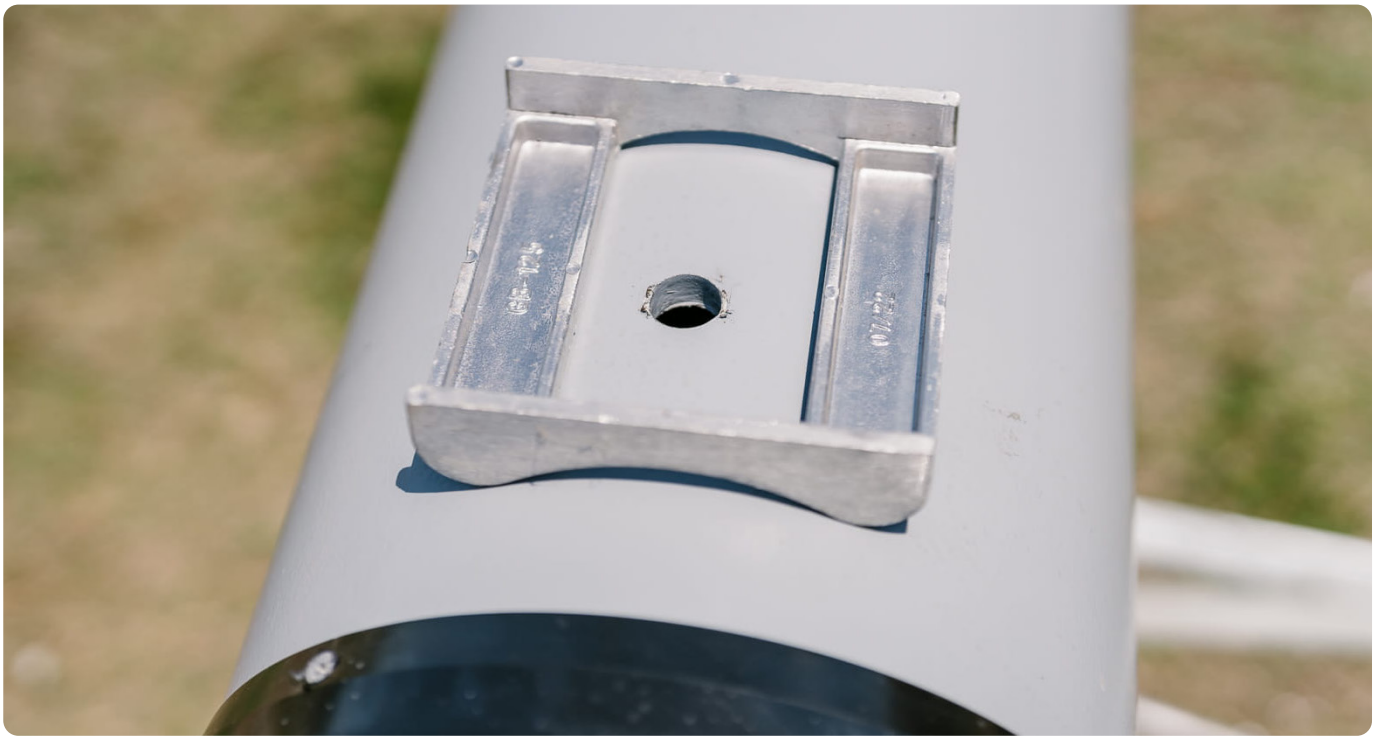


***Figure 5** - Photo of the predrilled pole*

Hazards and Controls

7.1	**Chemical**	Vinyl ester resin can contain styrene and other irritants, although cured resin emits gases minimally.
7.2	**Skin contact**	Wear gloves to keep fibres off your skin, and wash any exposed skin after work.
7.3	**Eye contact**	Flush immediately with water if dust gets in the eyes.
7.4	**Sharp Fibres**	Keep skin covered and wash thoroughly after work.
7.5	**Electrical**	Before climbing or drilling near energised lines, follow electrical safety protocols. FRP is an insulator, but tools and hardware are not. De-energise lines or maintain proper clearance per utility rules.
7.6	**Fall Hazard**	Drilling holes in a pole may require climbing. Use approved ladders or pole-climbing gear and fall arrest equipment at all times.
7.7	**Kickback**	Stand to one side and use a two-hand grip on the drill. If the bit catches, power off immediately to prevent wrist/arm injury.

8.0

Emergency Procedure

8.1 First Aid

In case of eye/skin irritation, flush immediately with water.

8.2 Injury

For any cuts or lacerations (fibreglass shards can cause small wounds), clean the area; seek medical care if needed.

Training and Competency

It is advisable that crews are trained in FRP drilling procedures. The engineering team at Wagner CFT remains available to address any inquiries.

***Figure 6** - Wagners CFT's team is available for training or enquiries*

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