ST PETER & ST PAUL COSGROVE

"THE STORY"

Stripping old lead from Nave and Gutter

Works area under temporary roof

Removal of lead to Gutters, white worm found.

Removal of lead, reveals decayed boarding to the ridge. Inspection of timber required urgently.

Ridge/Rafters timbers need replacing. Following extent of repairs required, the church was then closed.

Cause of problem

- Once the rotten boarding was found, removal of the full ridge timber had to happen, there was no strength or bearing of the roof structure as a whole.
- It soon became apparent that water penetration had made the timber very damp which in turn became a haven for deathwatch beetle.
- Over the years the deathwatch beetle has been eating away the roof timbers

"THE OFFENDER"

"The knock of death" The deathwatch beetle, Xestobium rufovillosum, is a woodboring beetle. The adult beetle is **7 millimetres**(0.28 in) long, while the xylophagous larvae are up to**11 mm** (0.43 in) long and can live as a larvae for up to 5 years in the same location.

"THE OFFENDER AS A BABY"

Larvae eating timber

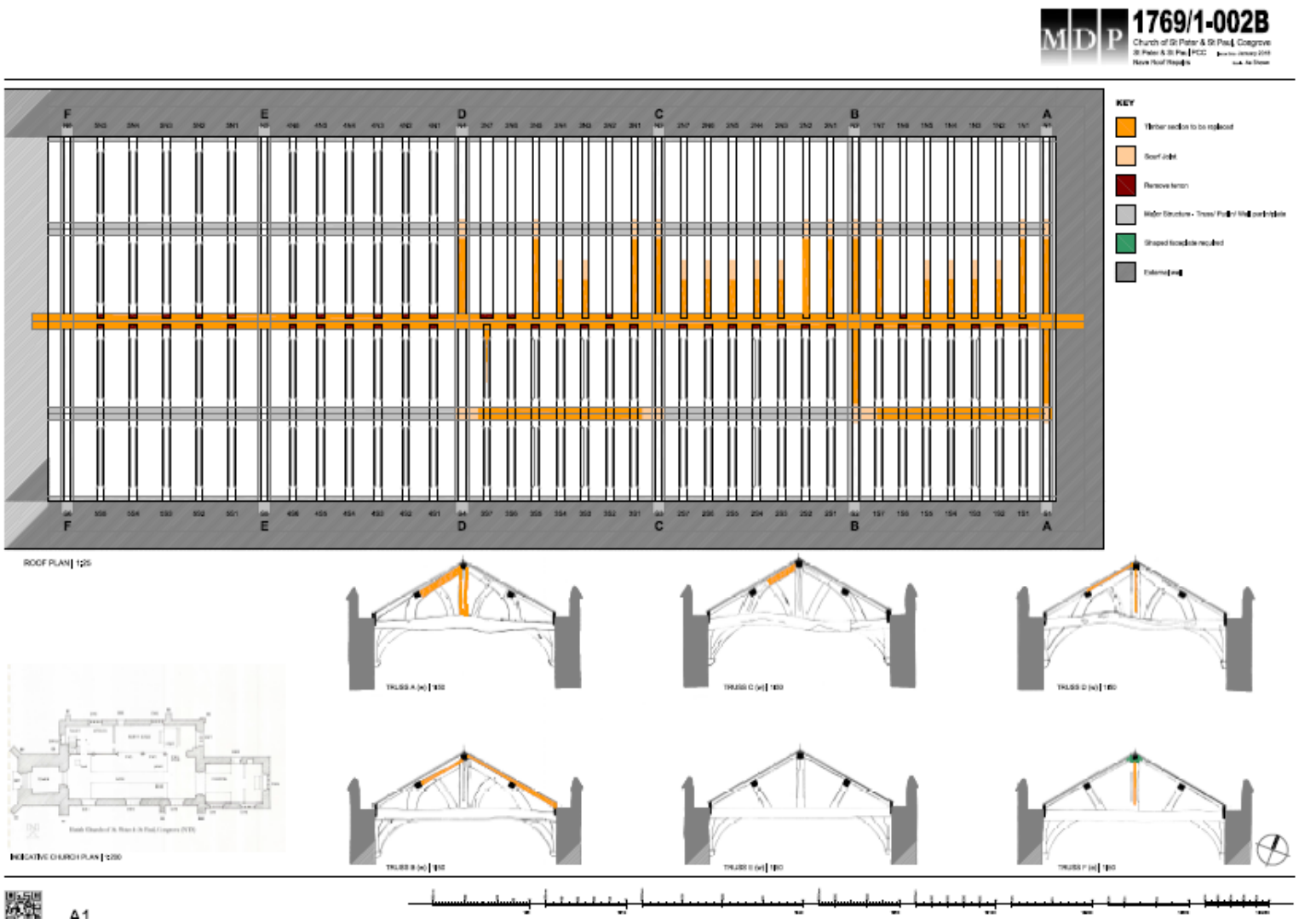
Internal scaffolding required to undertake repairs

Adaptions to scaffolding required without adding cost due to design scaffolding

“Design team inspect and produce details of repairs required”

- Three sets of drawings were issued so that CEL had to produce the most cost effective way with a very careful approach not to remove to much of the historic timber.
- It was found that in 1932 the roof was over boarded with a much wider board fixed over the original boarding.

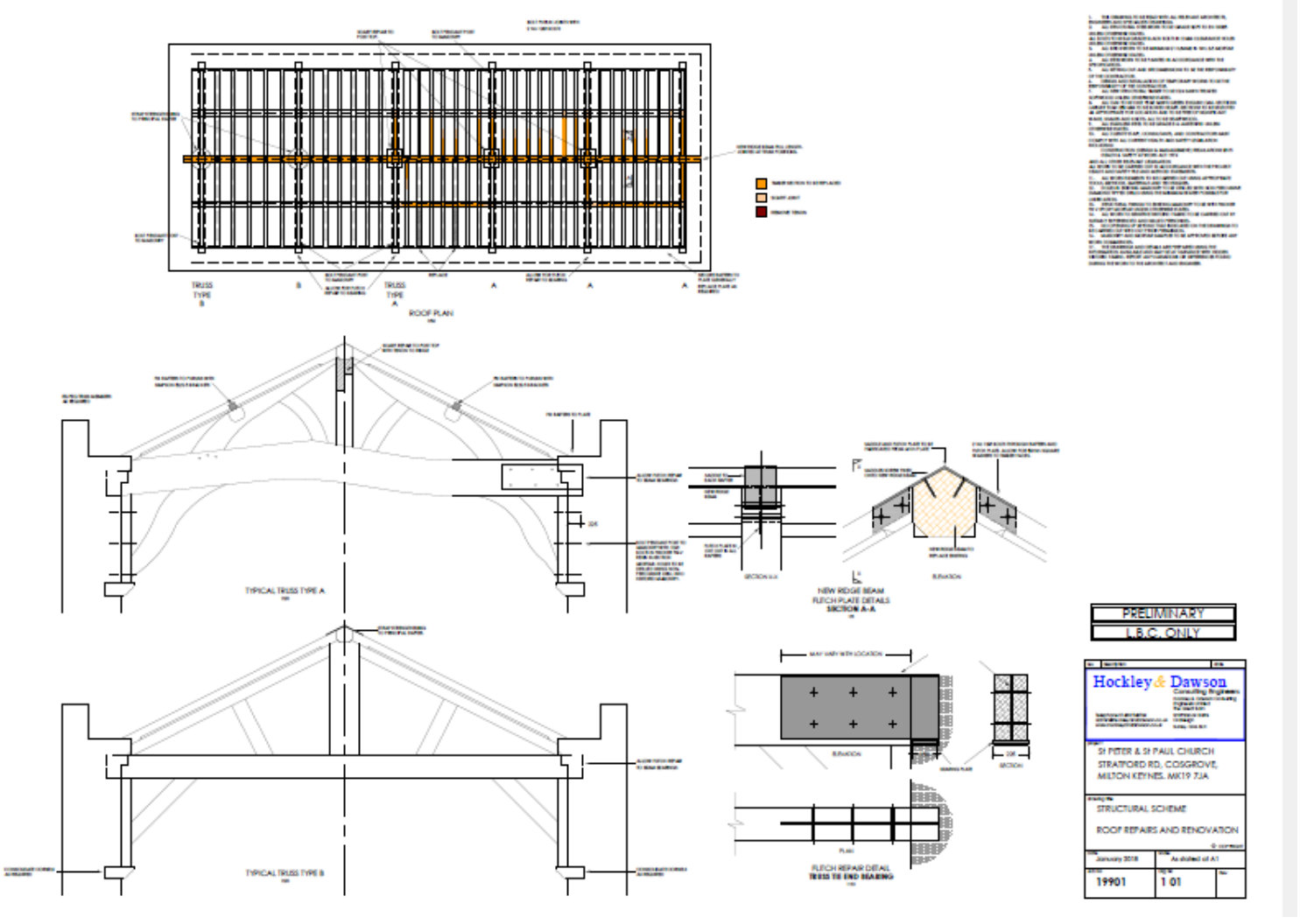
Design team issue details of repairs required



Extent of timber repairs were as follows

- 5 x Main oak ridges (approx. 4.5 long)weight approx 475kg each
- 12 x Full rafter replacements (with carving)
- 2 x Full Purling's (with carvings)
- 11 x Half scarf rafters (with carvings)
- 2 x Wind braces
- 2 x Large truss end sections
- Vast amount of replacement under and over boarding

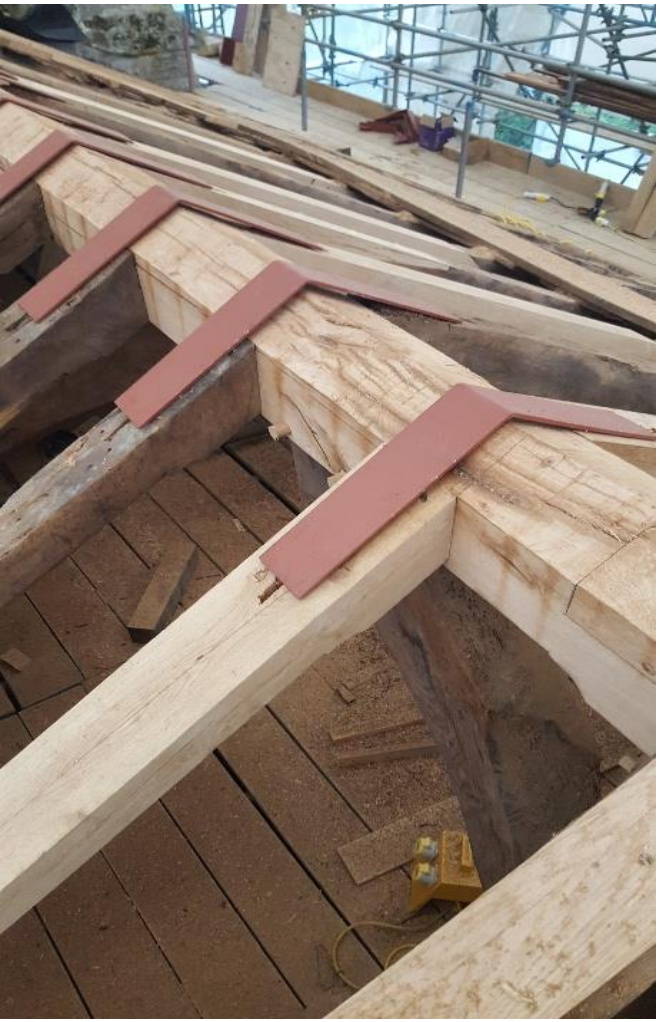
Structural Engineers details



Structural works required were as follows

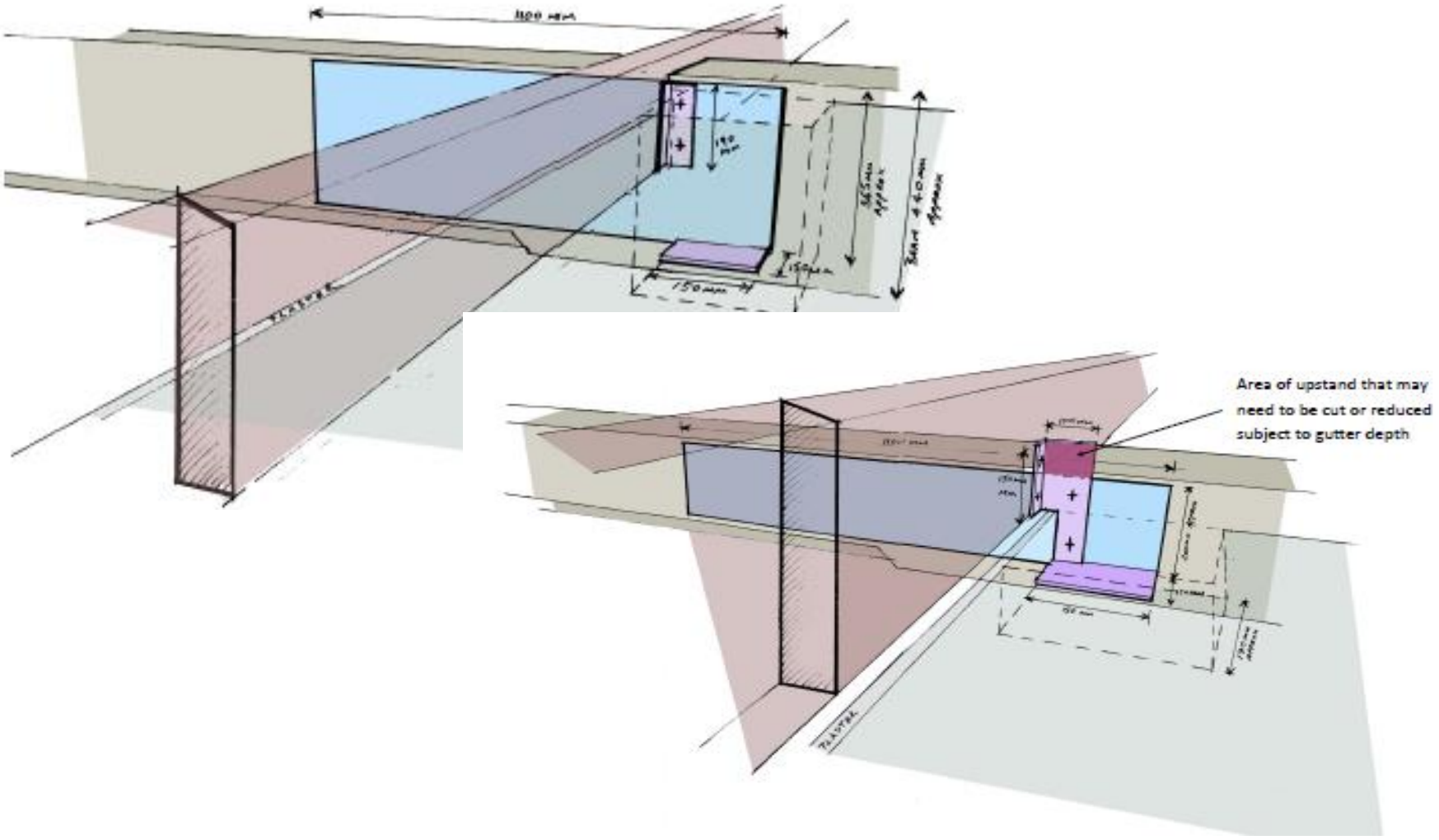
- 58 x Rafter plate fixings had to be made to install at the end of rafter to ridge
- 6 x steel plates had to be made and installed to the truss ends
- 24 x 16mm stainless steel bars had to be drilled and fixed to the Truss support base post
- Large vertical half laps had to be inserted to the king post
- 24 x Ridge plates, bolted over ridge on to rafters

Structural plates installed to support the new rafters.



No bearing to the truss ends

Steel plates had to be installed to the truss ends.



Steel plates

6 large, 10mm thick mild steel plates had to be installed with 18mm bar

Various traditional timber repairs had to be undertaken by hand

- Half lap
- Mortice and tenon
- Scarf joints

- All timber used on the roof structure was 4-7 years old air dried,
- European oak (in this case came from Southern France)

Timber arrives on site

- The main timber ridges weighed approximately 475kg each, with a moisture content of 20%.
- All of the structural oak timber used came from a forest in southern France and was classed as European oak structural grade.
- Once timber was checked and unloaded the craftsman began carving and preparing the old timber to accept the new.

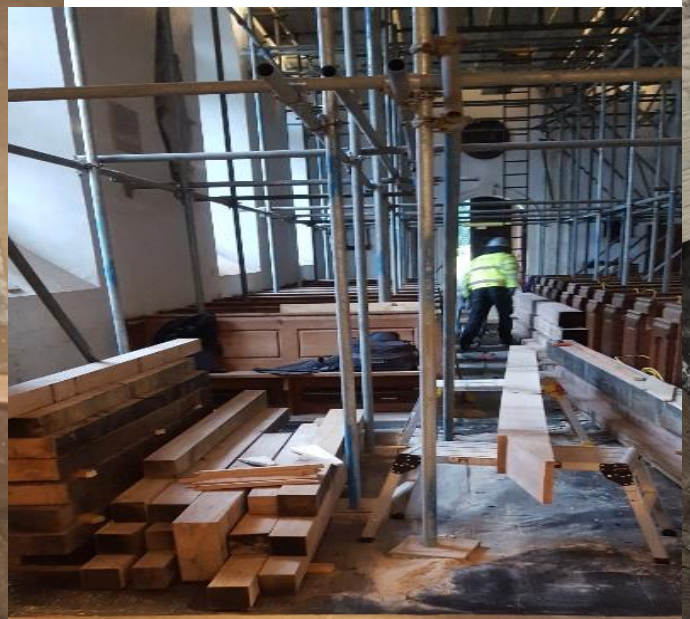
Ridge Timber arrives.

Each ridge timber weighed approximately

475 kg per section

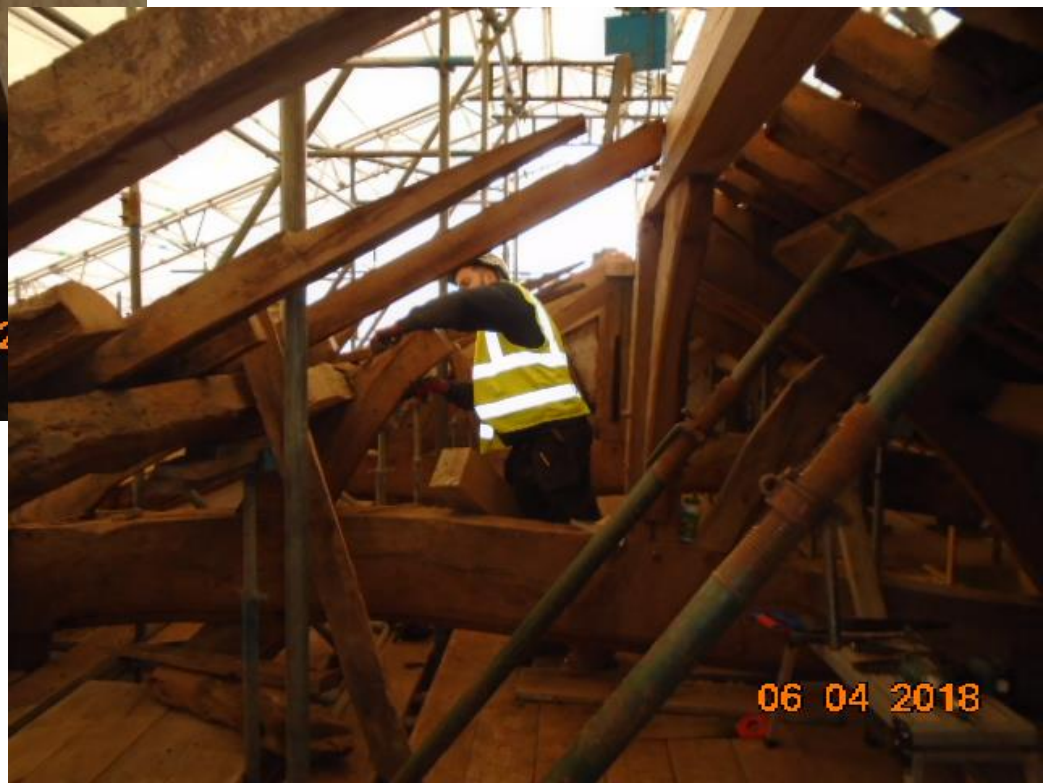
Full ridge timber replacement was required

Church became a carpenters workshop



Bay 1, ridge, truss and rafters being installed

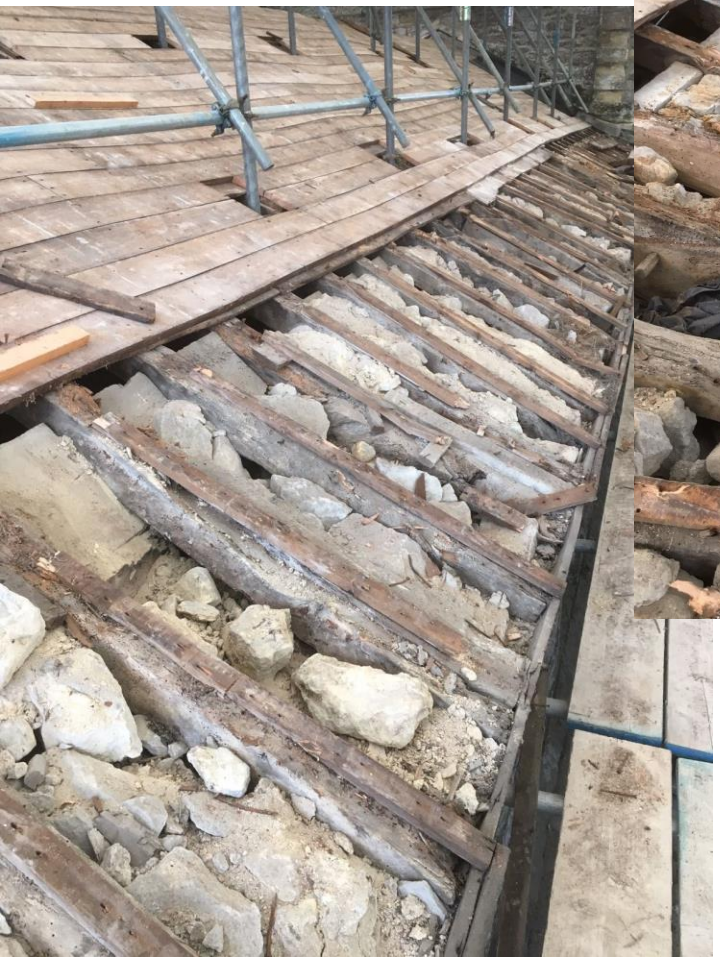
Note propping, confined space to work in



Bay 2 Ridge being fixed

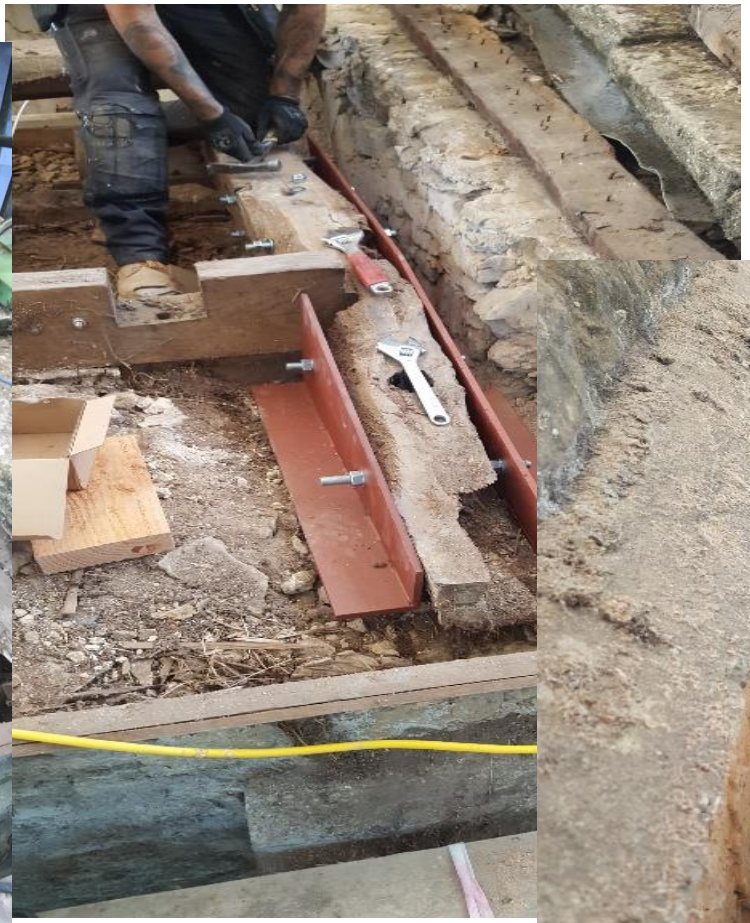
Bay 1 with new ridge and rafters installed Bay 3 with new wind brace installed, all carved by hand on site

No structural bearing to rafter ends, no ventilation to rafter ends to the south side of nave.



Following a visit by the design team, urgent repairs required to the South side of the nave

Structural works required to South of Nave



Structural works complete, followed by new over boarding to the Nave.

Lead laid in 1889 by “J. J. Atkinson”
Church wardens “Bull”

Your lead has been recast and re-laid

Lead details

- Lead that was removed from various areas was taken back to our casting shop and re-cast, brought back to site and laid.
- Gutter lead was Code 9 which weighs approximately 168kg per strip.
- Roof sheets weigh between 85kg and 105kg and these were Code 7.

- Code 7 and Code 9 is a terminology used in the trade, which means code 9 is 9lbs per sq foot and Code 7 means 7 lbs per sq foot.

Your old lead being re cast, PCC visit

Operatives laying lead over ridge.

North Aisle with new lead laid, all in “Hollow roll”

Just about there……

What you see today