FALCONS

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1 The Park
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Our ref: 5574

Your ref:

11 July 2025

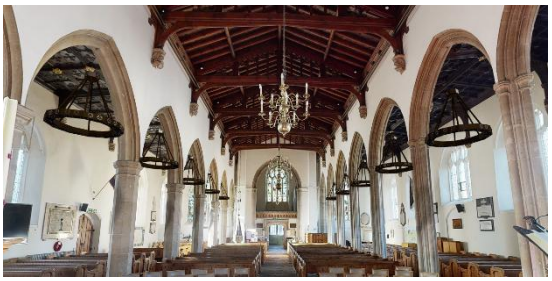
Attn. Mr Graham Shaw, Chair of Heating Group

Dear Sirs,

ST JOHN'S CHURCH, KEYNSHAM
Support of Proposed Heaters

We refer to your email of 25th June and to the subsequent site attendance of Dr Ken Falcon on 10th July, in company with Mr Graham Shaw, and confirm the following advices given verbally on site with respect to the proposal to **install suspended heaters from the centre of certain of the arches between the two aisles and the nave**.

An early artist's impression of the heaters in place is shown in the adjacent image. The heaters shown are Herschel Halo Infrared and are shown in arches S3 to S7 inclusive on the left and arches N3 to N7 inclusive on the right although we understand that a heater in not now planned for arch S5.

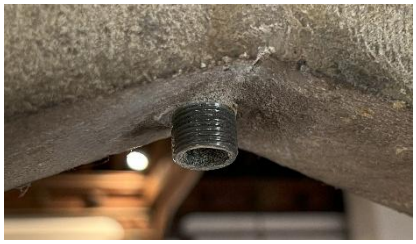


Our understanding is that the heater to be installed is the Herschel HALO Model IR-HALO-7800-D, the weight of which is given as 25kg.

The purpose of our visit was, with the help of a mobile scissor lift, to gain access to the top of an arch in order to measure the stonework profile and, thereafter, to provide details of a suitable bracket which would be fixed to the stonework above the arch within the aisle and be shaped in such a way that the heater, once hung, would be central to the arch. Such a bracket was fitted at St Mary's Church in Wedmore. A complication presented by restrictions in the case of St John's is that no fixing is to be made into the ashlar; such restriction was not present at St Mary's.

Having gained access to Arch N7 and measured the profile of the arch, our attention turned to the existing hook which was referred to, generally, in the email of 25th June as being Victorian and would "be cut off". The hook at N7 is shown in the adjacent image. Our initial reaction was that the hanger is substantial and more than capable of supporting a 25kg load, ie the weight of a heater.

Removing the hook which was not difficult, revealed an embedded, ⅝" diameter, steel/iron tube with the end ½" threaded ⅝" BSF, or similar. Such a thread would be more than capable of supporting a 25kg heater. See adjacent image.



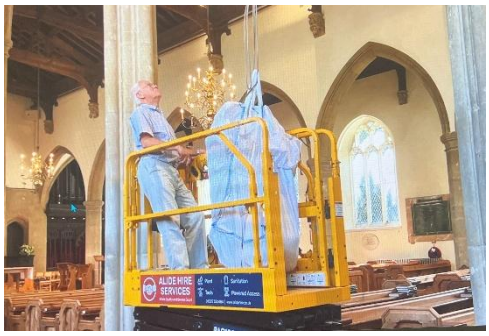
Indeed, even assuming that the hook is of brass, assessment later suggests that the threaded connection is, in theory, capable of supporting a load of at least 10 times the weight of the heater.

Of course, we do not know how the tube is fixed within the stone, nor the depth of embedment. Observations suggested an epoxy modified mortar around the circumference of the tube. Nonetheless, our initial thought was that the existing hooks could be used to support the heaters and that each could be 'proved' by a suitable proof load test.

At Section 7.5 of BS5950-1 2000, the standard allows for "*a proof test (which) may be used as a non-destructive test to confirm the general structural behaviour of a structure, structural assembly, or component*." At Section 7.5.2, the Proof Test Load is given, the appropriate load in the present case being 1.25 x the imposed load. Thus, in the present case of a 25kg heater, the proof test load could be taken as, say, 32kg. However, it was decided to adopt a factor of 2.0, rather than 1.25, by using a 50kg test load.

Using whatever was available, the test load was assembled using 2 bags of Thames Valley Flint each weighing 19.8kg and three house bricks weighing 10.4kg together, which gave a combined weight of 50kg. Obviously, bathroom scales are not calibrated, but, to in order to compensate for any underweight, the weight of the large builder's bag and the rope, which, combined, would have weighed of the order of 1½ kg, were not included

Testing was carried out by 1] placing the 'builder's bag' on the scissor lift with the test weight inside, 2] attaching a rope to the bag, 3] raising the scissor lift until the other end of the rope could be attached to the hook, 4] lowering the scissor lift until the test weight was lifted off the platform and was supported only by the hook. See adjacent image showing the test weight, in the builder's bag, attached to the hook in Arch N7.



After leaving the test weight attached to the hook for about1 minute, the scissor lift was raised in order to detach the rope from the hook and, importantly, to check that no movement of hook relative to the stonework had occurred.

Although not the original intention of the meeting on site, the opportunity was taken to use the scissor lift to test the hooks in Arches N7, N6, N5, N4, N3, S4, S3, S6 & S7 in that order.

In all cases, the 50kg proof test weight was supported by the hook for at least 1 minute and, upon closer observation, no movement of the embedded tube was noted, nor was any damage to the surrounding stone work noted. Images 1 & 2 below show the stonework around the hook in Arch S7 before and after the proof test.

Given that the testing was essentially opportunist, we await the comments of others as to whether, or not, our ad-hoc tests are acceptable as demonstrating that the hooks, having supported a proof test load of 50kg, are satisfactory to support a heater weighing 25kg.

We trust that the above is suitable for your present purposes and await your further instructions.

Yours faithfully,

Dr Kenneth C Falcon

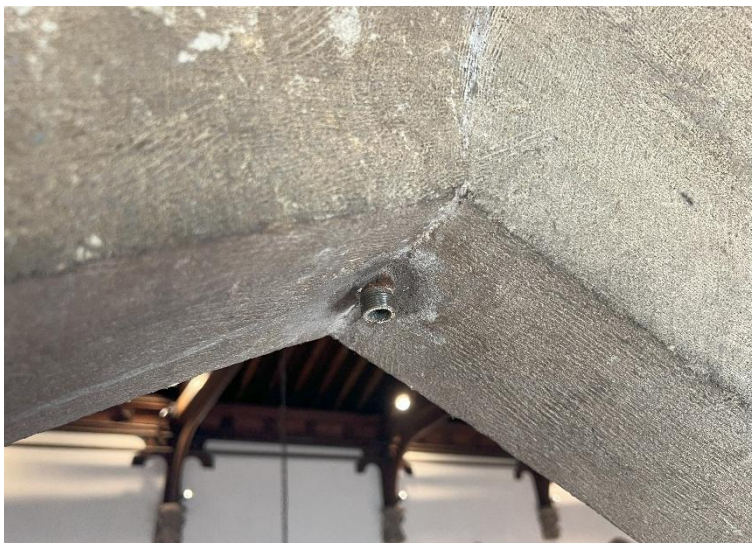


Image 1 – Hanger S7, with hook removed, before the test

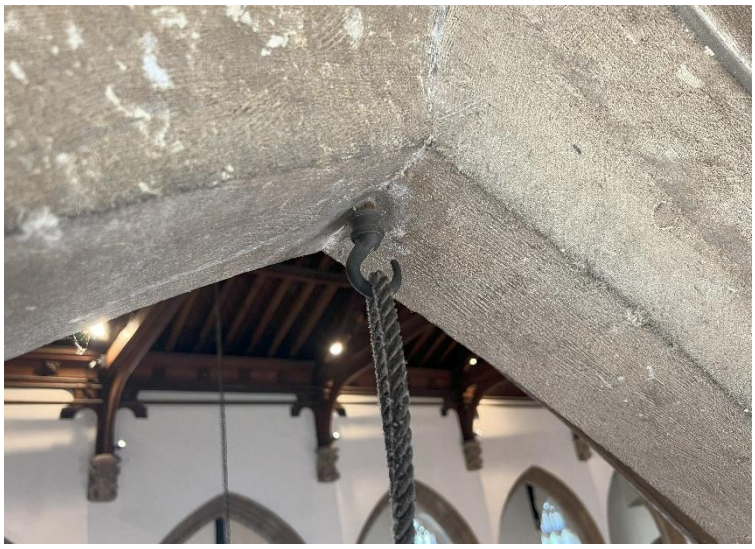


Image 2 – Hanger S7, with hook replaced, immediately after the tes.