Safety and the closure of the funicular at Cairn Gorm in August 2023 (2)

Description

This post comments further on the heavily redacted replies to Mr Gordon Bulloch's FOI request of 05/12/2024 about the 2023 closure of the funicular. **Email 1**, sent on 23rd August at 23.17, was considered in the first post in this series.

The emails are between the various parties involved:- Highlands and Islands Enterprise (HIE); Cairngorm Mountain Scotland (CM(S); Pick Everard (the inspectors who discovered the problem); COWI (the engineering consultants who designed the repairs; Balfour Beatty (the main contractors for the work); HSE (the Health and Safety Executive); and Sequs Consulting (the safety consultants who had helped declare the funicular safe to re-open).

Email 2

From: James Palmer <james.palmer@hient.co.uk>
Sent: Thursday, August 24, 2023 10:13 AM
To: [redacted]@cairngormmountain.co.uk>; [redacted]
[redacted]@cairngormmountain.co.uk>
Cc: [redacted]@hient.co.uk>; Paul Dzialdowski <paul.dzialdowski@hient.co.uk>;
[redacted]@cairngormmountain.co.uk>
Subject: Loose nuts
Importance: High

[redacted]

This morning I have found out about loose nuts on scarf and beam strengthening units, ones which are meant to be pre-loaded with post tensioning load.

This is mostly one unit per set of 7 with the beam strengthening locations and numerous nuts at scarf joints at various locations. The beam strengthening is therefore less concerning than the scarf joints.

The subject heading would make you laugh if it wasn't such a serious matter

If someone can explain the meaning of the last part of the first sentence I, and probably a few of those who were sent this email, would be grateful. The second paragraph is more informative and shows that there were more loose nuts on the metal brackets strengthening the scarf joints – which connect the funicular support beams to the pillars – than on those only strengthening the beams.

The next part of the email was completely redacted and then:

I have requested design teams to review the findings urgently, and that BB make arrangements to be on site as soon as possible to tension the units.

I will keep you informed on this developing situation.

James

James Palmer

Project Manager - Construction

The quick response to the first email from Pick Everard and the last paragraph does show Mr Palmer was responding appropriately. One wonders if he recalled the article in the P & J of an interview with Mr Ian Joy (see here) who had applied for the project managers job and told HIE a number of reason why the repairs wouldn't work including "there has been no oversight of quality control". The content of these emails show he was right.

Email 3

From: [redacted]
Sent: Thursday, August 24, 2023 1:38 PM
To: [redacted] James Palmer [redacted]
Subject: RE: Cairngorm Funicular - Supervisor Inspection 23/08/23

All,

Following discussions this morning we understand the request for the NEC supervisors to attend site this evening to conduct further assessment on the tensile resistance of the scarf joint and beam strengthening systems.

The NEC is responsible for formulating the regulations governing civil engineering and NEC supervisors are the people working for contractors who are responsible for implementing those regulations.

Worryingly, given who this email was from (see below), "tensile resistance" appears to be a meaningless term and the email should have said "tensioning".

The following section of the email has again been completely redacted but finishes as follows:

We will provide an update on our findings later this evening but trust that the re tensioning exercise for the full system can commence?

Kind regards

[redacted]

[redacted]
Director - Civil & Structural Engineering
Pick Everard

This suggests that Pick Everard did not appreciate the seriousness of what they had found or the implications. A re-tensioning exercise would require specialist equipment, not the abandoned spanner they had discovered on site (see first post).

Email 4

From: [redacted]@cairngormmountain.co.uk>
Sent: 24 August 2023 15:32
To: [redacted]@hient.co.uk>; [redacted]@cairngormmountain.co.uk>; [redacted]@cairngormmountain.co.uk>
Cc: [redacted]@hient.co.uk>; Paul Dzialdowski <paul.dzialdowski@hient.co.uk>;

Hi James

Many thanks for your call earlier today and for the note below.

We await further instructions from HIE once you are armed with information and a solution.

Regards –[redacted]

[redacted]
Chief Executive

This email, from

Susan Smith, then Chief Executive of CM(S)L, shows James Palmer had alerted her to the problems

by phone. The "note below" was not supplied in the FOI response, even in redacted form. This is quite obviously HIE just being plain awkward.

From: James Palmer
Sent: 25 August 2023 00:28
To: [redacted]@cairngormmountain.co.uk>; [redacted] [redacted]cairngormmountain.co.uk>; [redacted]@hient.co.uk>; Stuart Black <stuart.black@hient.co.uk>
Cc: [redacted]@cairngormmountain.co.uk>; [redacted] [redacted]@cairngormmountain.co.uk>; [redacted]@hient.co.uk>; Paul Dzialdowski <paul.dzialdowski@hient.co.uk>; Chris Roberts <chris.roberts@hient.co.uk>; Sandra Dunbar <sandra.dunbar@hient.co.uk>
Subject: RE: Loose nuts
Importance: High

Dear All,

A further note following tonight's surveys between [redacted] of the post tensioning units of the viaduct.

Regrettably, I can inform that a significant number of post tensioning units at the scarf joints are not loaded to the required stress levels [redacted]

The issue: The post tensioning stresses employed within the strengthening units provide a reactive force on the beams and joints that enable them to resist the loads induced by the operation of the carriage movement at full load. Without these the structure is under the standardised capacity for safe operation.

Note the time of the email, after midnight, and that this was sent to the Chief Executive (Stuart Black) and all the heads of departments at HIE and CM(S)L. That indicates the seriousness of the situation.

"Regrettably" !!! It would have been very regrettable if there had been an accident. Again the sentence uses incorrect engineering terms and should have said "a significant number of units (i.e the brackets) are not tensioned to required levels". (The terms "loaded" and "stress" in this sentence are inappropriate).

As the third paragraph states, unless the strengthening units around the beams and scarf joints were correctly tensioned the funicular was unsafe to use. HIE still hasn't explained whether anyone among those involved knows when the strengthening/ tensioning system failed and for how long the public using the funicular were placed at risk.

The next para in the email was again completely redacted then:

The solution: All units need to be restressed to the required loads, then an audit system and periodic inspection thereafter is to be employed. We are struggling to get the required specialists and equipment to site to enact the initial stressing item till early next week (Mon maybe, Tuesday definitely). Given the quantum of units to be addressed I must stress that this will take numerous days to complete. So even if we have them on site tomorrow, they won't be complete till, say, mid next week.

This paragraph again shows a confusion and misuse of engineering terms, for example "stressing" and re-stressed" should be "tensioning" and "re-tensioned". While it shows HIE did appreciate specialist staff and equipment were required it also shows their staff had no understanding of the seriousness of the situation since they thought the re-tensioning could be done in a matter of days (until "mid next week") when it actually took 18 months till February 2025!.

The reference to "*an audit system and periodic inspection THEREAFTER is to be employed"* is very concerning. What happened to the "*12-month snagging and inspection programme has been running since the relaunch, as is usual practice with complex engineering projects."* [HIE press release 06/09/2023.] And why hadn't that *"snagging and inspection"* work picked up the problems earlier?

Operational considerations: This morning I recommended reduced operational loadings on the knowledge of inspected areas [redacted]

I have a planned call first thing tomorrow with the parties of the funicular reinstatement team (Contractor, designer, NEC supervisor etc). At this meeting I will glean more information from the inspections, and I will seek COWI determination on continued operation given the current circumstances.

As I understand it, the staff train movement is at 9.30am and the first public train operation is at 10:00am. I will seek to provide an update prior to these milestones.

Please be assured that the project team are employing all the required resource to understand and rectify this item. The gravitas of the situation is not underrated.

Regards

James

Also extremely concerning are the references to *"reduced operational loadings"* and *"continued operation"* !!! The strengthening brackets were installed to ensure the return to SAFE operation of the funicular and yet the project manager was recommending its continued use after several had failed and before an expert opinion had been obtained from COWI! That is perhaps an indication of the pressure HIE staff were under to keep the funicular open or maybe it was just too late at night and his concentration was waning?

Email 6

From: James Palmer <james.palmer@hient.co.uk>
Sent: Friday, August 25, 2023 11:59 AM
To: [redacted]@cowi.com>
Cc: [redacted]@hient.co.uk>; Paul Dzialdowski <paul.dzialdowski@hient.co.uk>; [redacted]@pickeverard.co.uk>; [redacted]@pickeverard.co.uk; [redacted]@pickeverard.co.uk>
Subject: Loose nuts

[redacted]

I appreciate that we have discussed this extensively over the past 48hrs, but I do now need to formalise our request of COWI.

Firstly, please can we have your formal advise on loose nuts that have been found on post tensioning units of the scarf joints and beam strengthening, and your assessment of risk on continued operations.

As I understand it, the staff train movement is at 9.30am and the first public train operation is at 10:00am. I will seek to provide an update prior to these milestones.

Please be assured that the project team are employing all the required resource to understand and rectify this item. The gravitas of the situation is not underrated.

Regards

James

This indicates that 36 hours AFTER the inspector reported a serious problem the funicular was still being operated by HIE. It appears they wanted “formal advise” (SIC) before they were prepared to close it for safety reasons.

Email 7

From: James Palmer
Sent: 25 August 2023 12:19
To: [redacted]@cairngormmountain.co.uk
Cc: [redacted]@cairngormmountain.co.uk>; [redacted]@sequs.co.uk>; [redacted]@hient.co.uk>; [redacted]@cairngormmountain.co.uk>; Chris Roberts <chris.roberts@hient.co.uk>; [redacted]@cairngormmountain.co.uk>
Subject: Informing HSE

[redacted]

Please can you inform [redacted] and [redacted] at HSE of the current situation. Comms lines to the HSE should follow something along the below, appreciating you have a closer relationship with them and may wish to introduce the item accordingly in your own manner.

Highlands and Islands Enterprise (HIE) has taken the decision to withdraw the Cairngorm funicular railway from service temporarily while an issue that could potentially affect public safety is addressed.

A 12-month snagging period and inspection programme has been ongoing since the funicular came back into service in January. This week, inspectors identified that some of the scarf joint assemblies that provide force to link the beams at the top of the piers did not meet the required tension. As a result, HIE has decided to take the funicular out of service until this tension can be restored.

This email appears to have been addressed to Susan Smith, whose earlier email showed no understanding of what was going on and that is reinforced here by James Palmer telling her what she should tell HSE. Nothing like passing the buck! The suggested wording of the email was downplaying the severity of what had been found and implied this had been part of the planned inspection programme. In fact Pick Everard only discovered the problem when they found an abandoned spanner

Email 8

From: [redacted]@cairngormmountain.co.uk>
Sent: 25 August 2023 12:27
To: [redacted]@hse.gov.uk>; [redacted]@hse.gov.uk>
Cc: [redacted]@cairngormmountain.co.uk> [redacted]@cairngormmountain.co.uk>; [redacted]@cairngormmountain.co.uk>; [redacted]@cairngormmountain.co.uk>; [redacted]@sequs.co.uk>; [redacted]@hient.co.uk>; Paul Dzialdowski <paul.dzialdowski@hient.co.uk>; James Palmer <james.palmer@hient.co.uk>; Chris Roberts <chris.roberts@hient.co.uk>
Subject: CMSL - Informing HSE on Funicular Defect
Importance: High

The email sent from Susan Smith to HSE used James Palmer's wording, so is not repeated here. HIE underplayingthe significance of what they found is important because HSE were supposed to undertake aninspection on the funicular in 2023 which did not happen. I will come back to in a later post..

Email 9

From: [redacted]
Sent: 25 August 2023 18:05
To: James Palmer
James,

Please find below our opinion on the risk associated with the presence of un-tensioned bars within scarf joint and beam strengthening assemblies and the operation of the funicular.

Recent inspection Findings:

Our understanding from the email communications and discussion with Pick Everard's NEC supervisors is a significant number of scarf joint assemblies have been found to have bars which are not tensioned. This is contrary to the requirements of the Construction drawings. The precise number is not known.

Scarf Joints:

The scarf joints have been strengthened principally due to the uncertainty in determining the shear capacity of the beam/scarf joint and also whether a failure mechanism may exist that the codified approaches may not take into consideration. [redacted]

This email from COWI provides the "formal advise" requested by HIE and uses the correct engineering terms.The key point here was that the failure of the tensioning was contrary to the requirement of the construction drawings. After a redacted section it continues:

Beam Strengthening:

The beam strengthening differs from the scarf joints in that the reason for strengthening was due to shear utilisations greater than 1.00 being found in particular spans. Reference to COWI report A132354-Rp03-04 reported utilisations up to [redacted]

and then the remainder of the email, apart from it being signed by a Project Director for COWI, has been redacted.

Email 10

From: [redacted]@cowi.com>
Sent: 25 August 2023 18:05
To: [redacted]@pickeverard.co.uk>; [redacted]@pickeverard.co.uk>; James Palmer <james.palmer@hient.co.uk>; [redacted]@pickeverard.co.uk>; [redacted]@pickeverard.co.uk>; [redacted]@balfourbeatty.com>; [redacted]@balfourbeatty.com>; [redacted]@balfourbeatty.com> [redacted]@cowi.com>; [redacted]@cowi.com>
Subject: RE: Cairngorm Funicular - Supervisor Inspection 23/08/23

Further to our discussions earlier, our initial thoughts on measures and procedure for the restressing.

1. Consider use of a paint marking system or similar for the bar ends/nuts to indicate the final position of the nut relative to the bar on completion of all stressing operations. The aim being that a simple visual inspection would identify if significant loss of tension has occurred as this would be visible by change in relative paint marks.
2. Have each stressing team undertake a trial stressing at a scarf joint to demonstrate their understanding of the sequence and prove their application of the methodology.
3. Develop a clear understanding of how the system performs during installation. The aim being to be able to identify any changes in tension between increments/stages that is unexpected. It may take multiple installations to build up this understanding.
    a. Record the stress/pressure at each increment.
    b. When restressing to the next increment record the pressure when the nut runs free (break loose check).
4. Undertake a check of sample of the installations on the pressure in the assemblies at times beyond 24hours. A simple break loose check would suffice with the stress/pressures recorded an compared to the stressing records.

Regards,

[redacted]

[redacted]
Project Director

COWI

It is not clear why the Director of COWI has started using the terms “stress”, “stressing” and “restressing” when the correct terms used in the previous email are “tension”, “tensioning” and “re-tensioning”. There are a number of different terms used in these emails describing the tension of the studding in the brackets, “pre-loaded” with “post tensioned load”, “post tensioning units”, “post tensioning stresse”s etc. Unless someone in each repair squad had a degree in mechanical engineering one wonders with all this confusion about terms how are they going to understand the tensioning process? Is that why the brackets failed (or rather probably never worked properly) after the funicular re-opened in January 2023?

All the recommendations in this COWI email, however, should have been carried out BEFORE the funicular was re-opened in January 2023 or as part of snagging programme. The email therefore reinforces concerns about what was done during the snagging and inspection programme and whether those involved understood what they were supposed to be doing.

 While *“consider use of a paint marking system or something similar”* might

appear mickey mouse when you can buy nut position indicators (left) the key point is a system should have been have been in place for identifying whether nuts were at the right tension before the funicular was re-opened in January 2023.

A simple inspection is all that anyone should have been doing UNLESS qualified to use the specialist tensioning equipment which according to the emails was NOT available on site! In the absence of visual indicators that would involve tapping the nuts with a light hammer, commonly known as a pin hammer, listening for a dull thud that would indicate loose nut or stud.

Points 2,3 and 4 in COWI’s email indicate just why the re-tensioning process took a year and a half to complete. It is a skilled job, requiring contractors to understand what they are doing. There were thousands of nuts to check and, because if you adjust the tension of one it affects the tension of others on the same bracket, they all have to be done together – hence the need for specialist equipment.

How HIE now intends to monitor those thousands of nuts to ensure the brackets remain at the right tension and the funicular remains safe to use is unclear. That will be complicated by further issues with the metal studding and nuts that form the brackets which I will consider in my next post. Not only will it be costly but it is unlikely to work for long because of the fundamental design flaws in the funicular I have covered in previous posts.

Category

1. Cairngorms

Tags

1. Cairn Gorm
2. funicular
3. HIE

Date Created
March 31, 2025
Author
graham-garfoot