

# Construction question

- Is it possible to incorporate a thin piece of G10/coating of epoxy on the beam bottoms and use an epoxy grout (both have high resistivity) during construction?

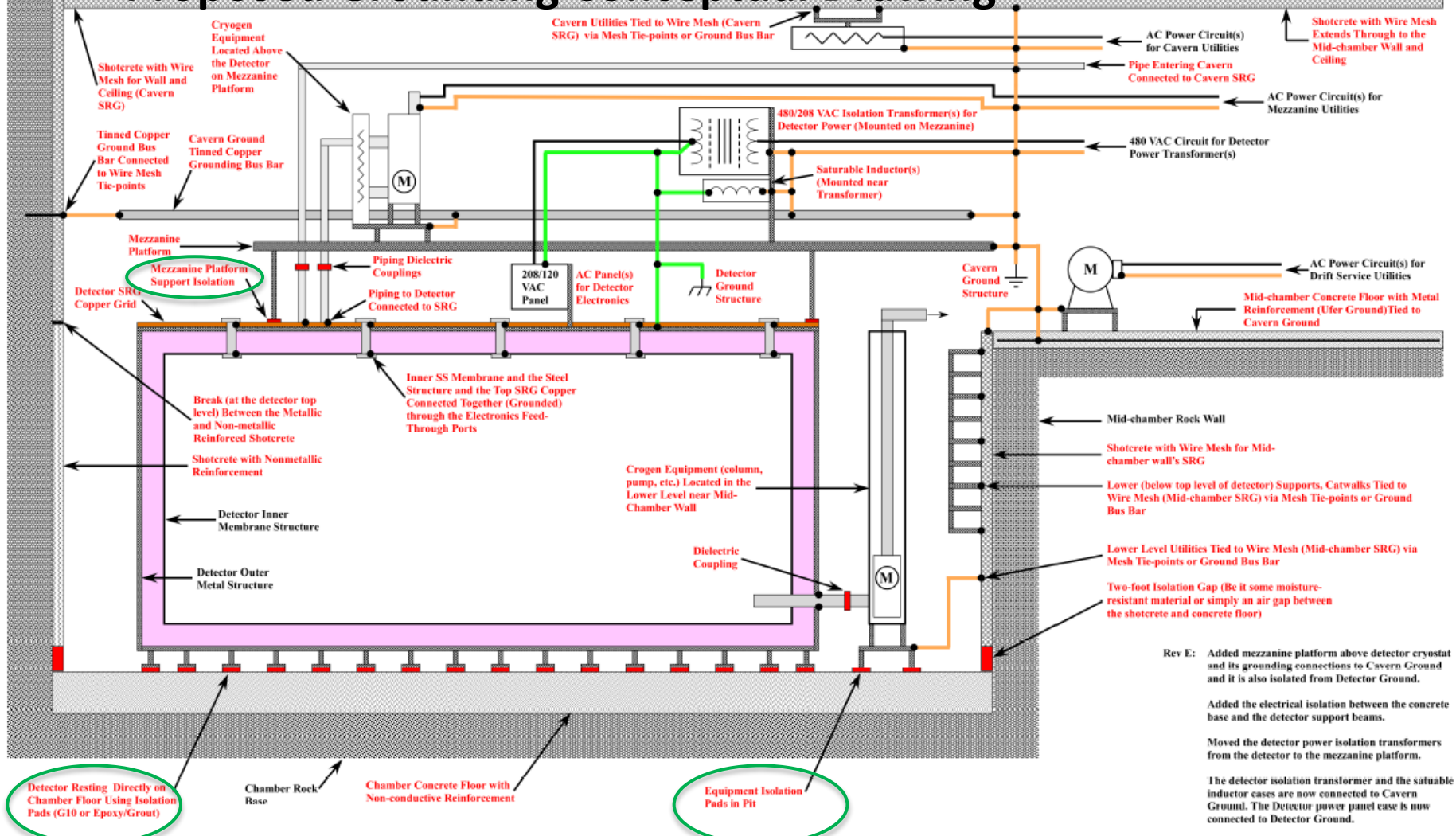
Email from Tom Hamernik – November 20, 2017

... Epoxy has excellent dielectric properties (including volume resistivity values of  $10^{12}$  ohm-cm and greater, a high dielectric strength) and high compressive strength, as well. It is commonly used in civil construction and available for a number of applications, including as a grout and as a floor coating. ...

Idea is that we could use epoxy grout and maybe coat beam bottoms or concrete with epoxy.

**ALSO - Can we use vapor barrier between rock and concrete pour to make sure we keep additional moisture out of concrete?**

# Proposed Grounding Conceptual Drawing



DUNE Far Detector Conceptual Grounding Diagram (1 of 4 Caverns)  
 LBNF/DUNE Steve Chupe 12-12-2017 1 of 1 8

## Theresa M Shaw

---

**From:** Thomas Hamernik  
**Sent:** Thursday, December 21, 2017 11:17 PM  
**To:** Marzio Nessi  
**Cc:** Theresa M Shaw; Douglas Pelletier; Tracy K Lundin; Elaine G McCluskey; Joshua Willhite  
**Subject:** FW: Epoxy Coatings  
**Attachments:** DP UHS 2\_15.pdf; Fast Clad ER Epoxy 7\_15.pdf; Macropoxy 646 4\_16.pdf

Marzio-

At this week's LBNF/DUNE interfaces workshop, I promised to send you some product data for epoxy coatings for steel and concrete. Attached are three products from Sherwin-Williams, a major producer used extensively here in the United States. There are other manufacturers, but this is the only one who has responded to me so far. I will forward other product data as I receive it.

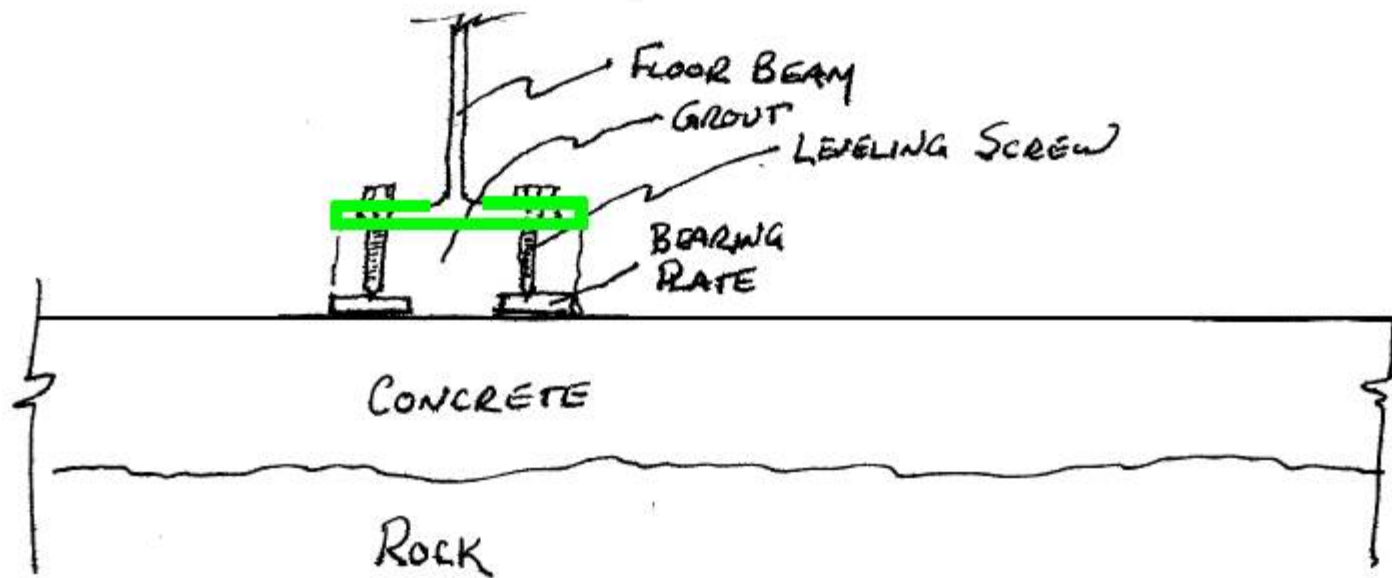
The coatings described in the attached product data sheets (and discussed by the manufacturer representative in his email, below) are high-build products (two of which can be applied at rates of up to 50 mils per coat) suitable for both concrete and structural steel. Although volume resistivities are not readily available, their reported high dielectric strengths suggest good insulative properties, and, based on my earlier calculations, 50 mils is far in excess of what we need for typical epoxies. A single 10 mil coating of Macropoxy is likely sufficient though I note the Fastclad ER claims good edge build and retention – something that might make it particularly useful for coating the edges of the bottom steel flanges (which are likely to come in contact with the grout).

Any of these products could be used to coat the steel (to isolate the steel from the grout and underlying concrete slab) or coat the concrete slab (to isolate the steel and grout from the underlying concrete slab) or both for a belts-and-suspenders approach with the added benefit of serving as a concrete sealer (if applied over the entire floor and not just directly under the detector beam/grout contact areas). Coating at least the portion of the concrete floor beneath the footprint of the grout avoids the issue of the bolts/bolt holes serving as conduction paths. Following are some sketches showing how the epoxy coating might be used.

The manufacturer representative offered to get us both dry and wet samples if we are interested.

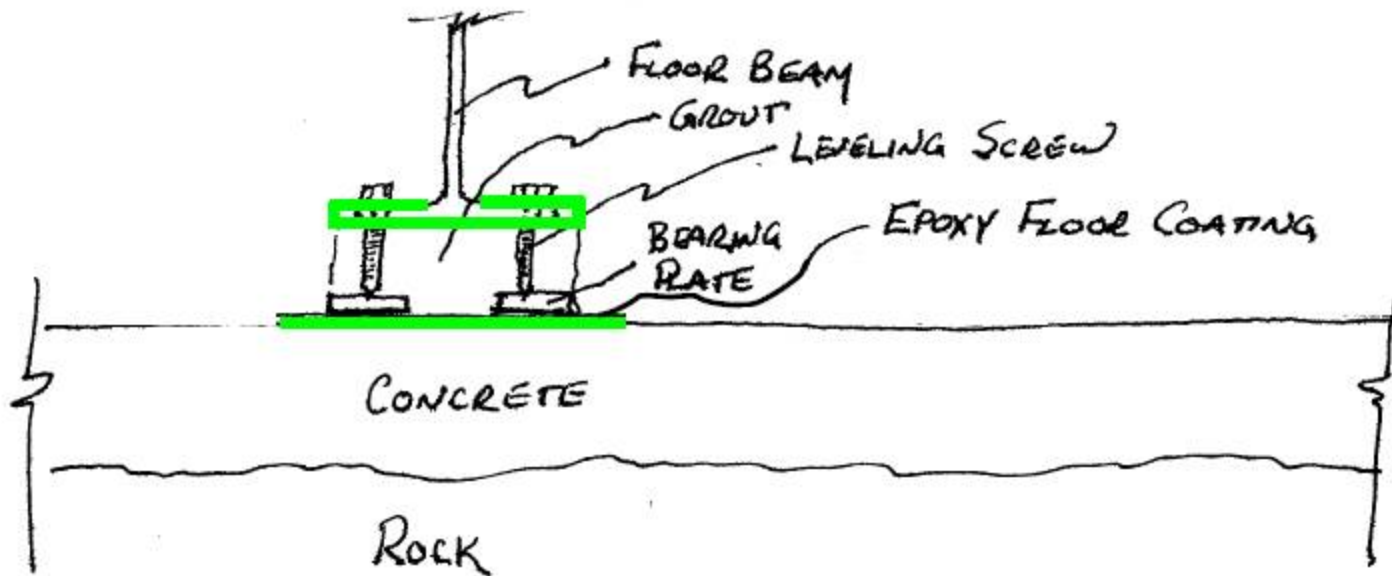
At the interfaces workshop, I suggested using epoxy grout would be another approach to isolating the detector steel, but, I suspect, more costly.

Please contact me if you have any questions.



Application of Epoxy Coating to Steel Isolate Detector Steel from Underlying Concrete and Rock - Need to Address Conductive Path Through Leveling Screws/Plates (Perhaps Remove Screws after Grouting)

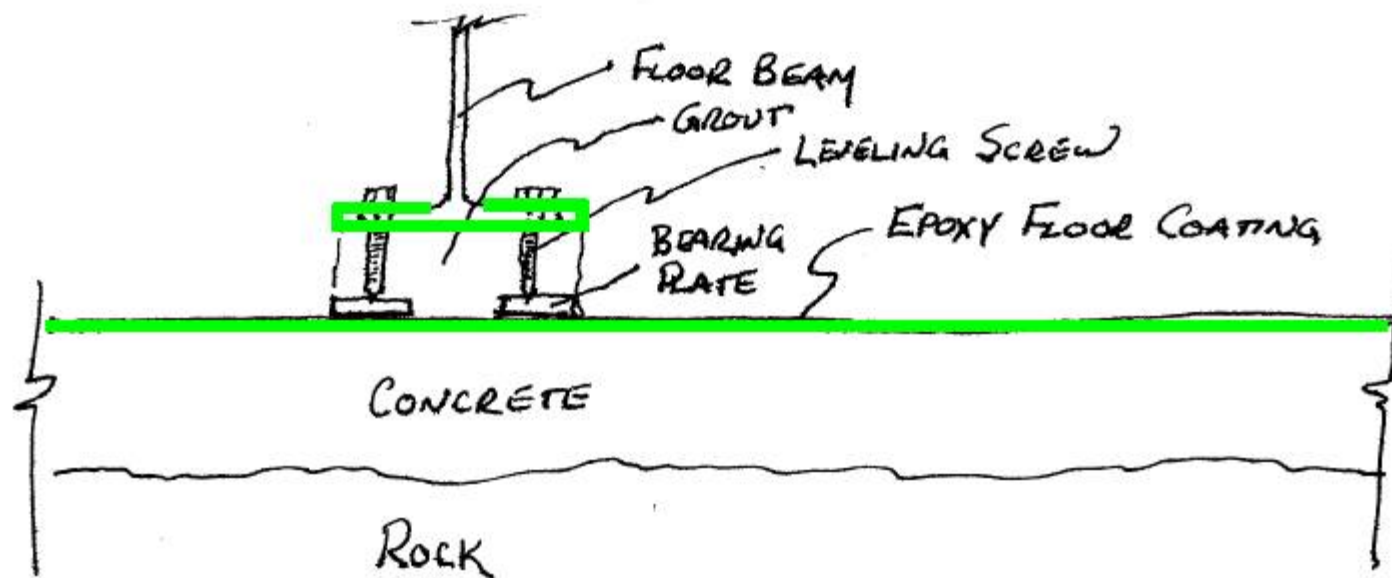
T. HAMEENIK  
11/20/2017



Application of Epoxy Coating to both  
Concrete and Steel (Belts and  
Suspenders) to Isolate Detector  
Steel and Grout from Underlying  
Concrete and Rock - Floor Coverage  
only at Contact Areas

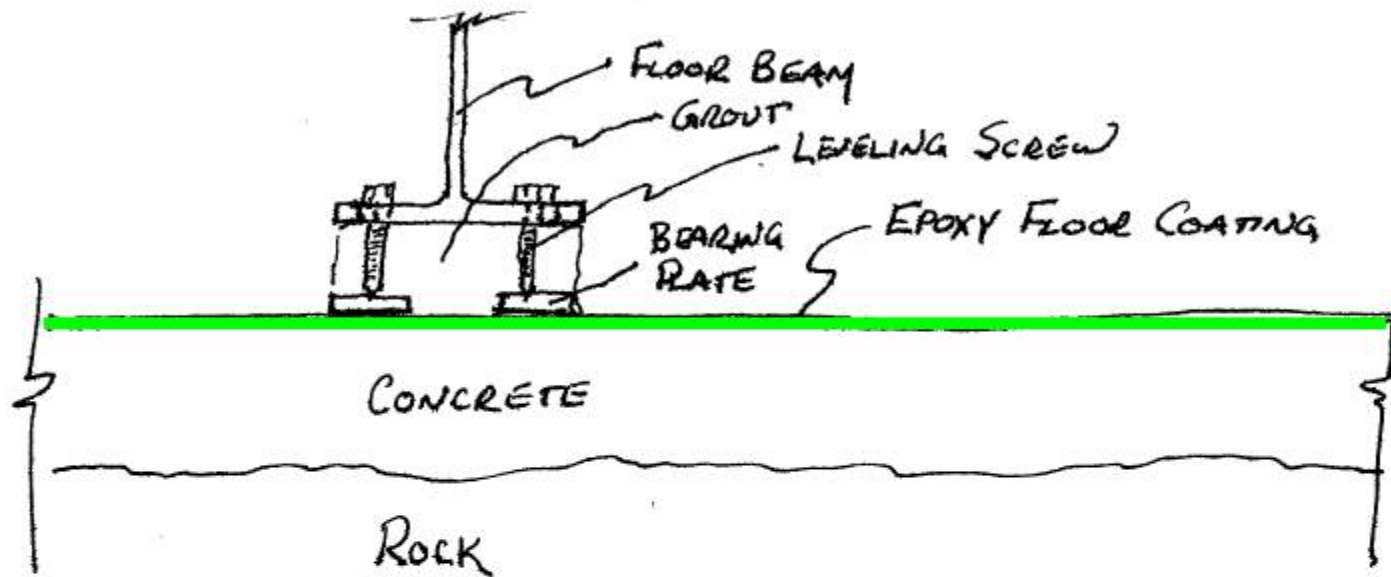
T. HAMERNIK  
11/20/2017





Application of Epoxy Coating to both Concrete and Steel (Belts and Suspenders) to Isolate Detector Steel and Grout from Underlying Concrete and Rock

T. HAMEENIK  
11/20/2017



Application of Epoxy Floor  
Coating to Isolate Detector Steel  
and Grout from Underlying  
Concrete and Rock

T. HAMERNIK  
11/20/2017

*Near Site Conventional Facilities Project Manager*

**Long Baseline Neutrino Facility**

Fermi National Accelerator Laboratory  
P.O. Box 500, MS 220  
Batavia, Illinois 60510  
USA

630 840 4712 office  
630 926 0908 mobile  
[www.fnal.gov](http://www.fnal.gov)  
hamernik@fnal.gov

**Connect with us!**

[Newsletter](#) | [Facebook](#) | [Twitter](#)

---

**From:** John V. Sierzega [<mailto:john.v.sierzega@sherwin.com>]

**Sent:** Wednesday, December 20, 2017 5:19 PM

**To:** Thomas Hamernik <[hamernik@fnal.gov](mailto:hamernik@fnal.gov)>

**Subject:** Epoxy Coatings

Tom,

Great speaking with you today. Here are the 3 coatings I was thinking.

First is our Macropoxy 646. It is a 68% solids epoxy that can go on concrete and steel substrates. It is used a lot in structural steel. It can be applied at up to 10 mils per coat.

Second is our Duraplate UHS. It is a 100% solids epoxy that can go on concrete and steel substrates, and can be applied at up to 50 mils in a single coat.

Third is our Fastclad ER. This is also a 100% solids epoxy that can be used on concrete and steel substrates, and can be applied up to 50 mils in a single coat. This is a product I have used on pilings for a solar farm on the structural steel. Its dielectric strength is 777 v/mil.

Please let me know if you have any questions,

John Sierzega  
The Sherwin Williams Company



Project Development Manager, Protective and Marine Coatings  
12261 Nicollet Ave, Suite D  
Burnsville, MN 55337  
Cell: 708 935 4519  
[john.v.sierzega@sherwin.com](mailto:john.v.sierzega@sherwin.com)