



NOvA Update

MINOS Collaboration Meeting
Fermilab
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Advisory Committees

- There are two sets of hoops to jump through in the process of getting approval and funding:
 - Advisory committees:
 - Approved by the Fermilab PAC
 - Strong endorsement from NuSAG
 - We have interpreted the EPP2010 recommendation to “pursue an internationally coordinated, staged program in neutrino physics” as an endorsement.
 - On June 23, P5 issued an interim report stating “We recommend the start of construction of the NOvA neutrino oscillation experiment.... This experiment is complementary to the other neutrino oscillation experiments on a world-wide basis and represents the next step for the U.S. in a phased international program...”
 - On July 6, HEPAP accepted the P5 recommendations without dissent.



DOE Reviews

- **NOvA passed its CD-1 review in April and is now preparing for the most crucial review, CD-2.**
- **CD-2 requires a technical design report and sets the baseline cost and schedule of the project.**
- **We are planning a Director's CD-2 review in January and the DOE review in March.**
- **The previous plan for the far detector building was through a cooperative agreement that would be put out for competitive bids.**

This process has now been simplified: The DOE has notified the University of Minnesota that it would welcome an unsolicited proposal to build the far detector building.



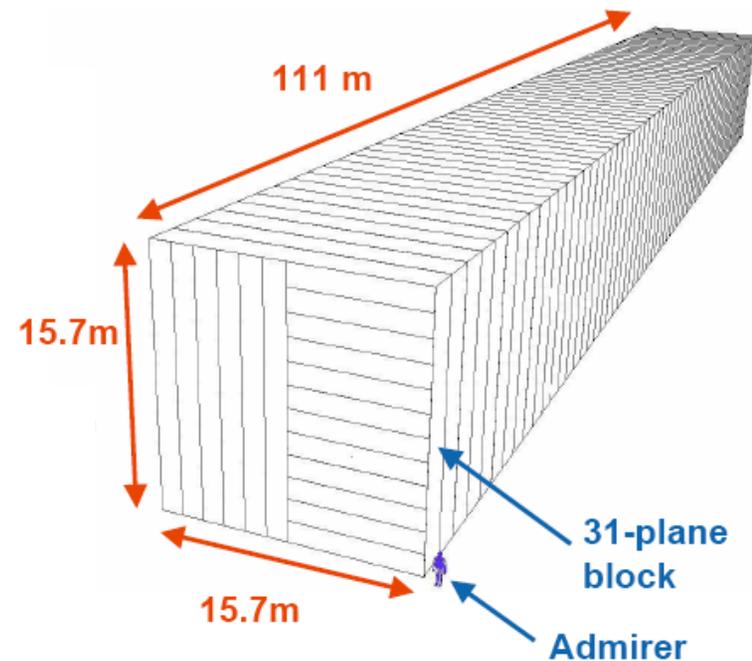
Problems and Issues

- **A brief look at problems and issues we are working on. No conclusions yet.**
 - **Adhesive strength**
 - **PVC creep**
 - **Optimization of light output**
 - **Static buildup**
 - **Overburden**
 - **Near detector orientation**



Adhesive Strength

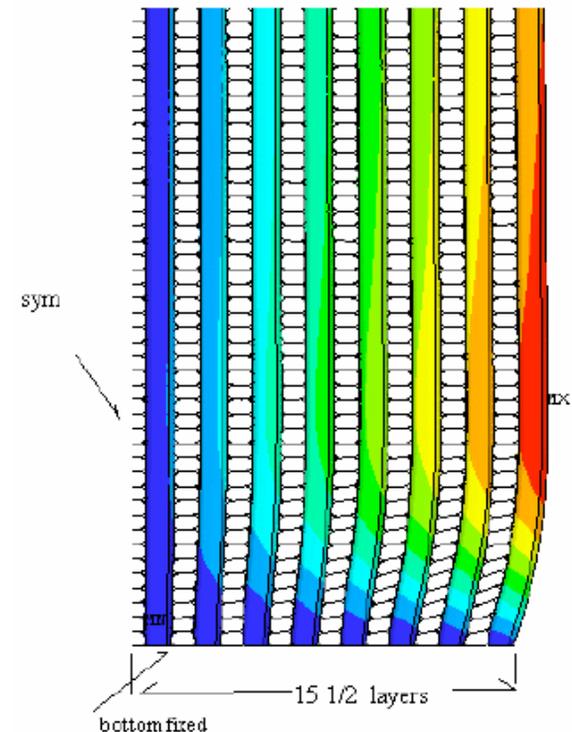
- The NOvA far detector is equivalent to a 5-story building built out of plastic, with the additional complication of 19 psi hydraulic pressure at its base.
- There are a number of issues with the strength of the adhesive.
- A possible solution is rf welding, which is said to be as strong as the material itself.





PVC Creep

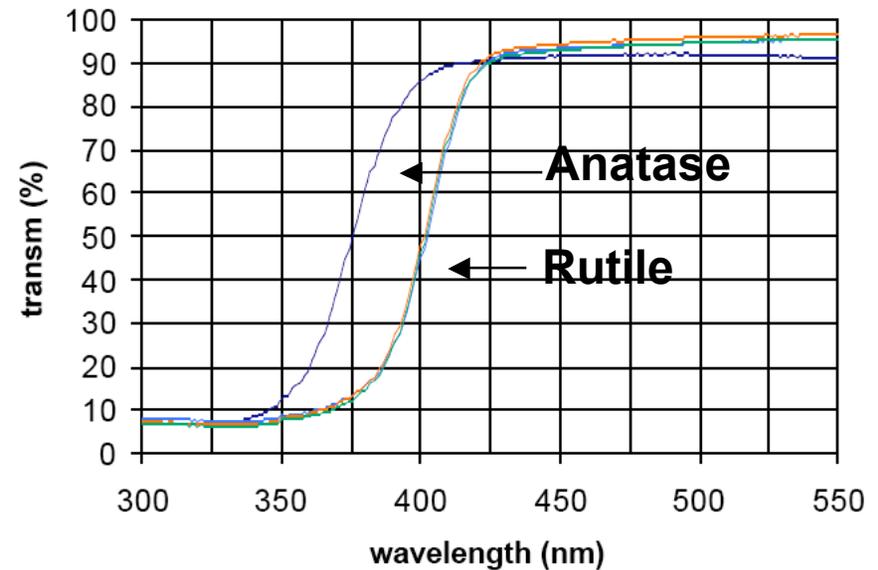
- Plastic is plastic and creeps with time under stress.
- The blocks of planes will bow out under hydrostatic pressure. There is concern that creep over time could weaken the material and cause failure.
- Proposed solution is to fill the gaps between blocks with a rigid foam after construction to relieve any stress from creep.





Cost Optimization of Light Output

- Requirement of 20 p.e. from the far end of each cell.
- Current baseline is 0.8 mm WLS fibers, 5% pseudocumene, and rutile TiO_2 .
- Possible cost savings in using 0.7 mm fibers and compensating for the light loss with anatase TiO_2 and/or more pseudocumene.



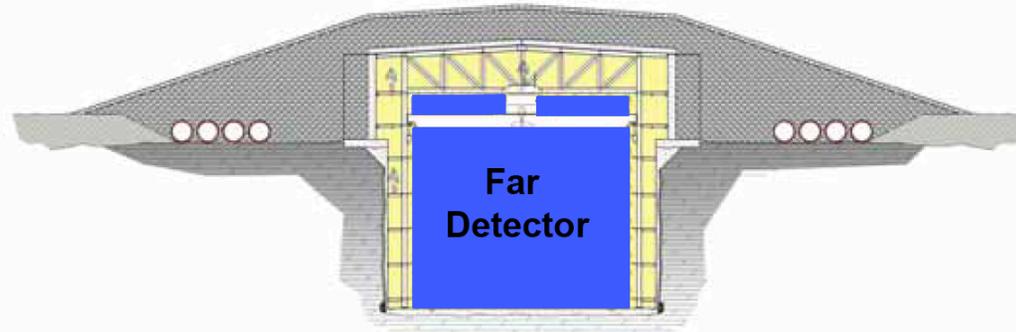


Static Buildup

- **Liquid scintillator is an excellent insulator. On filling, it can build up a static charge through the triboelectric effect. This can cause a spark which could ignite the scintillator or puncture a hole in the PVC.**
- **Proposed solution is to add 2 parts/M of Stadis 425, an antistatic agent, ground the base of the PVC, and fill the scintillator without creating an aerosol.**
- **There is no light attenuation at this concentration, but long-term effects are not known.**



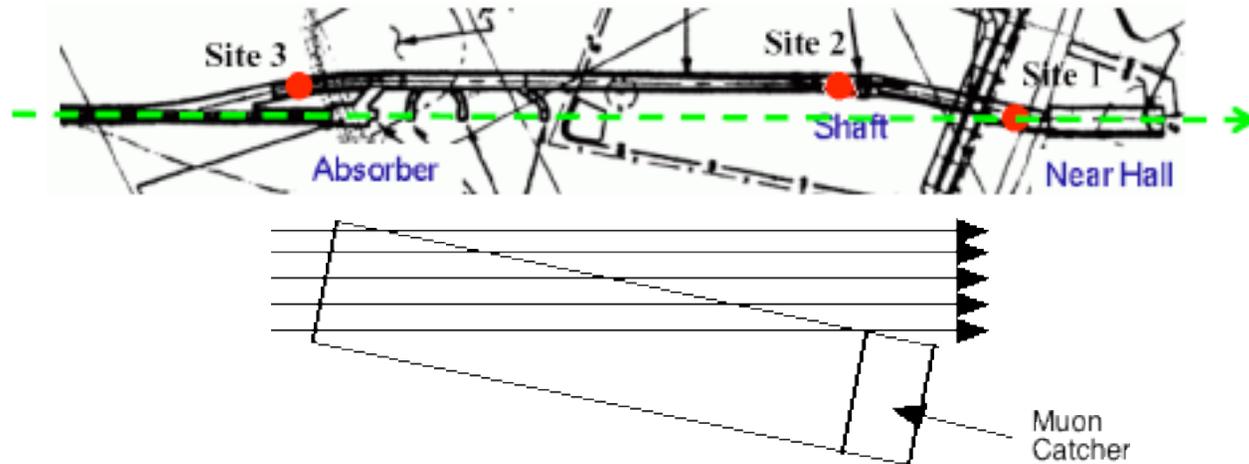
Overburden



- CDR overburden design (3 m granite on a steel truss roof support system) is very expensive.
- Mark Messier is doing calculations which indicate that 3 m can be reduced by a sizeable factor.
- Looking into using barite (BaSO_4) to replace granite (2.2 x gain in weight) and other possibilities.
- My prediction: the steel truss will not be necessary.



Near Detector Orientation



- NuMI access tunnel is orientated $\sim 12^\circ$ to the off-axis beam. This creates a containment problem and makes the near and far detectors different in the transverse direction.
- Possible solutions:
 - Rotate the detector, blocking the tunnel.
 - Excavate a small alcove in the tunnel.