Long Cable Installation Procedure for EMTiming system

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This note describes the installation of the Long Cables for the EMTiming system. The installation will be done by a group of four people under Dervin's supervision. The purpose of those cables is to bring the LVDS signal produced by ASD boards in the Relay Racks in the Collision Hall to the LVDS TDCs located in the readout crate on the first floor. A total of 48 cables need to be installed, including spare cables; 28 cables are for the CEM system (3 cables/rack, 2 racks/arch, 4 arches = 24 + 1 spare/arch = 28) and 20 cables are for the PEM system (4 cables/rack, 2 racks/side, 2 sides = 16 + 1 spare/rack = 20). Each Long Cable is approximately 220 ft long and has 25 twisted pairs of wires (3M 3644B/50). They will be tested, labeled and bundled prior to installation.

People

A crew of 4 people can do the installation. One person stays on the first floor and feeds the Long Cables into the Collision Hall. Two persons have to work on the forklift, and one person works on the top of the detector. The person on the first floor can be from a TAMU group since it is the easiest part of the installation and does not require any specific training.

Time

One such cable was installed during February shutdown. It took ~2 hours to complete the whole job. The cables will be bundled (~4 cables/bundle depending on the final detector destination) and we can do a bundle in a single "drop." The current conservative estimate is 1 drop per day. For the CEM detector we need a total of 7-8 drops, or a total of 8 days. For the PEM detector we need 4-5 drops, or 5 days.

Installation

All the cables for both the Central and Plug go into the same TDC crate (Rack 1RR18F). The person on the first floor feeds a cable bundle under the tiles on the first floor from the TDC crate to the appropriate penetration hole[1]. The cables are fed through the hole into the Collision Hall (known as a pull). A crew on the forklift slowly pulls the cables down. The pull has to proceed very slowly in order to avoid damaging already installed cables. After the pull the cables are brought along the ceiling to the top corner of the Plug detector or Central detectors, and down to the corresponding Crates/Relay Racks. The cables are dressed at both the top of the detectors, where the excess cable slack is kept (done by the person at the top of the detector), and at the crate itself. We note that for the Central arches the 3 cables/rack are split into 2 cables in the top crate and 1 in the bottom, and for the plug there all 4 cables go into the middle crate. All spare cables will be stored on the top of the detector.

[1] There are two penetration holes. One is for the East side of the detector; another one is for the West side.

Figure 1 shows a person on the lift pulling the long cable. Figure 2 shows the installer plugging the long cable into the ASD on the front of the middle crate in the Plug Relay Rack. In this case the cable has already been pulled and dressed on the top of the detector.

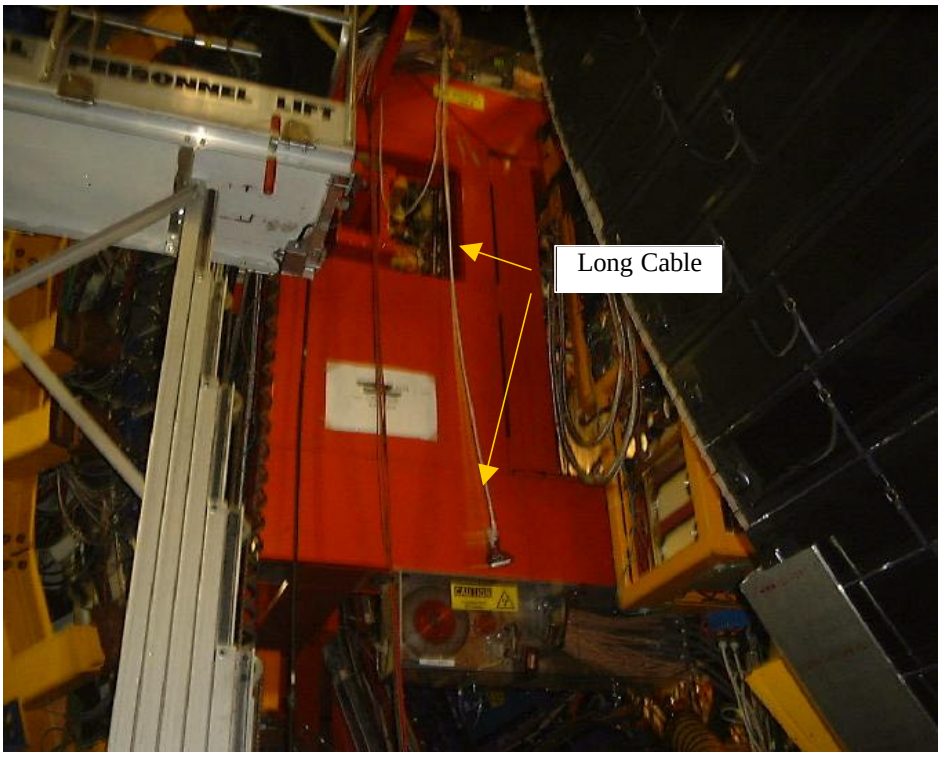

Figure 1
A person on the lift is pulling the long from the penetration hole into the Collision Hall.

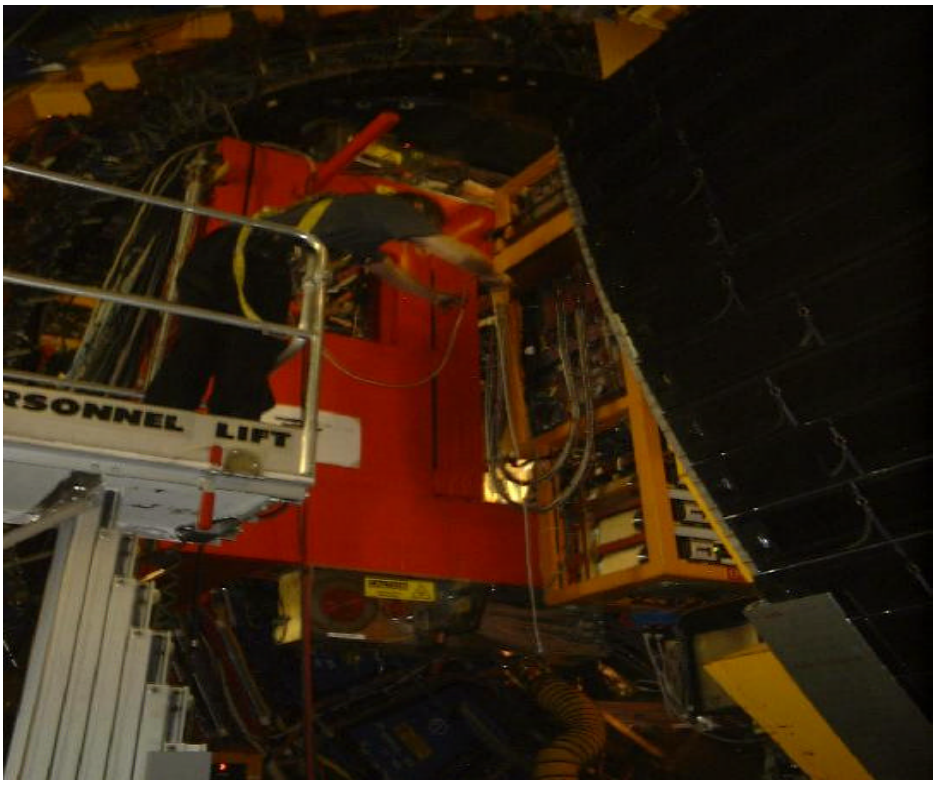

Figure 2
The installer plugs the cable into the ASD in the front of the middle crate of the PEM readout rack.