CamTran

Inclined Plane Rehabilitation Project Work Stoppage Timeline

This document presents a timeline of events and actions that have been taken by CamTran with regard to the current Project Work Stoppage/Delay. The current delay is due to the discovery of broken strands in the safety rope. In the interest of safety and caution, work was stopped, and an investigation was started to determine the cause of the broken strands. Since that investigation was started, the quality and hardness of the sheave wheel rims are also being investigated.

The investigation is currently ongoing, but the initial findings are that the broken/cracked strands, in the safety cable, were caused by damage in the cable and most likely caused during the construction project either while the cable was being removed, stored, or reinstalled on the inclined plane.

The safety cable is a 2-inch diameter cable made up of multiple core wires each wrapped in many smaller strand wires. The safety cable is used as part of the back-up safety brake system for the Inclined Plane.

The following bullets provides a timeline of events:

- **11-28-23**
  Inclined Plane cars were being moved to continue rehabilitation work. A visual inspection of the ropes/cables was performed during which a piece of the braided safety cable was found to be broken and sticking out from the cable. Further inspection revealed multiple breaks along the cable, all of which were in close proximity to one another. Operations were immediately halted, and the cars were locked in place for safety purposes pending an investigation into the cause of the breakage. CamTran notified the PennDOT State Rail Safety Oversight Office of what had happened, and they reiterated that the cars should remain locked down until a detailed inspection can be performed and causal factors be identified with a remedy plan.

- **12-05-23**
  BFL Splicing, arrived at the site on 12/05/23, and conducted ultrasonic testing of both haul cables, inspection found the north and south haul cables to be satisfactory, no formal report was provided at this time. The safety cable was not x-rayed due to existing damage. The inclined plane cars were operated to conduct these inspections and when completed the cars were returned to their docks and again tied down.

- **12-05-23**
  The Engineer of Record conducted inspections of the known breaks along the safety cable as well as the safety sheaves. During this inspection, additional breaks were identified in close proximity to those breaks previously discovered. Cars were moved in conjunction with inspection and tied down when completed.

- **12-6-23**
  The Engineer of Record provided a response that detailed the situation and indicated the ropes should be replaced prior to revenue service and that the system can continue to be operated to complete the work of the electrical contractors. The cars remained tied in position despite this directive given an affirmative root cause had yet to be identified at this time.

- **12-08-23**
  The initial preliminary findings were forwarded to PennDOT.

- **12-11-23**
  Jeff Conroy, P.E. (an expert in Inclined Plane design and operations) was contacted by the construction management firm onsite to oversee the project with regard to conducting a root cause analysis to determine the cause of the breakage found in the safety cable.

- **12-12-23**
  Ultrasonic testing report of haul ropes were received from BFL Splicing.

- **12-15-23**
  A conference call was held between CamTran and Jeff Conroy regarding his availability to conduct the root cause analysis. It was agreed that Conroy would arrive on 12/19/23 to conduct an inspection. A proposal to conduct the work was received later that day.

- **12-19-23**
  Jeff Conroy was on site to conduct an inspection. The cars were moved in conjunction with the inspection and tied down when completed.

- **01-04-24**
  Jeff Conroy provided his feedback on the situation based upon a visual observation which led to more questions about the cause of the broken strands that would require a more in-depth investigation into:

  - Cable cleaning and careful examination.
  - Sheave Wheel Rim detailed examination.
  - Sheave Wheel Rim material confirmation and Rim hardness testing.
  - Review of design and inspection reports.

- **01-08-24**
  On January 8, a meeting was held in reference to Conroy's analysis. The results of this meeting were as follows:
    - Incline cars shall not to be moved.

- All work associated with the sheave wheels is to be halted, this includes manufacturing, installation, and testing.
- An independent engineer with appropriate expertise will be engaged to conduct an in-depth investigation and provide a conclusive opinion on the root cause of the safety cable breakage.

- **Weeks of January 8th and 15th, 2024**
  PennDOT and CamTran developed a work plan and contacted potential consultants that might have the expertise to conduct the detailed investigation. It was determined that the consultant with the most expertise and experience in Incline rail was Jeff Conroy. Jeff Conroy was contacted and asked to provide a work plan and price to conduct the more in-depth investigation.

- **February 6, 2024**
  Jeff Conroy was engaged in a contract with CamTran to conduct the in-depth investigation into the root cause of the safety cable wire breaks.

- **Weeks of February 6, 2024 to March 18 2024**
  Jeff Conroy's team conducted an on-site visit gathering measurements of the cables and Sheave wheel rims, conducting hardness testing of the sheave wheel rims, and cleaned/inspected the cables.