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LAKE SUPERIOR & ISHPEMING RAILROAD TRACK REHABILITATION PROJECT FALL 2009

CIVIL SENIOR DESIGN TEAM
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ABSTRACT:

The Lake Superior and Ishpeming Railroad (LS&I) is located in Marquette County in Michigan's Upper Peninsula. LS&I operates roughly 32 miles of single mainline track between the Tilden and Empire mines in western Marquette County to the docks at Presque Isle in Marquette, MI. LS&I primarily hauls iron ore pellets from the mines to the docks to be shipped to the lower Great Lakes for steel making. In order for LS&I to increase capacity two areas for improvement were focused on the Pine Hill Scale and the Midway Location.

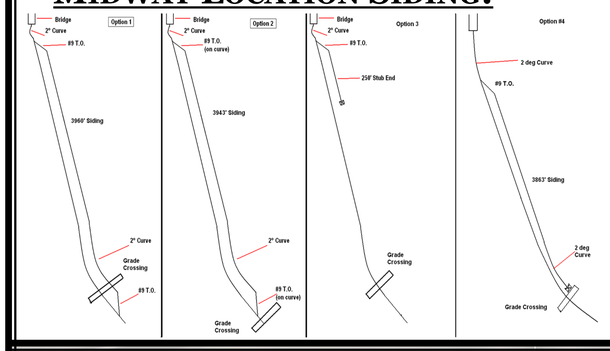
OBJECTIVES:

The Efficiency through Engineering and Construction Enterprise (ETEC) was tasked with the overall project administration as well as an operations analysis and a scale replacement analysis. ETEC also assisted with construction scheduling, cost estimates, permits and funding sources available. In addition to these tasks ETEC served as the liaison between all three groups and the project advisors and mentors.

PINE HILL SCALE REPLACEMENT:

After the loaded 120 car trains leave the Eagle Mills Yard the train must pass over the Pine Hill Scale to be weighed. The trains must slow from 20mph to 2mph to pass over the scale. The speed reduction helps preserve accuracy and minimize wear on the scale. The trains must also pass over the scale at 2 mph empty. This speed restriction drastically impacts overall capacity, fuel efficiency, and both locomotive and car maintenance. An increase in speed over the scale could greatly increase LS&I's efficient movement of ore.

MIDWAY LOCATION SIDING:



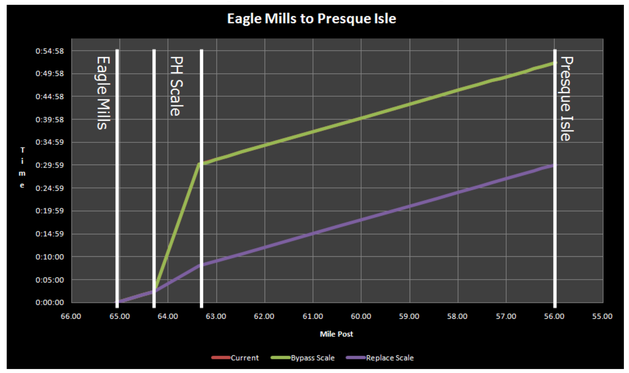
The Midway location was determined to be the best location for a passing siding to increase capacity. LS&I could double the tonnage hauled over the mainline with the addition of a passing siding. The Civil and Environmental Senior Design group designed several alternatives for the Midway locations. The siding had to be designed between two bridges and a grade crossing, while still being able to accommodate the 4000' long train.

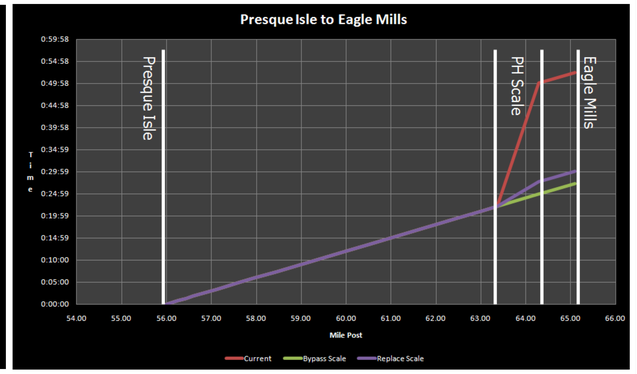
ALTERNATIVES EVALUATION:

ETEC evaluated three options as a result of designs from the Civil Senior Design Team.

1) Construct a by-pass track around the Pine Hill Scale (PH Scale)
2) Construct a passing siding at the Midway Location
3) Replace the Pine Hill Scale

Each alternative was evaluated based on *cost*, *interruption to operations*, and *overall increase in capacity* for LS&I. The graphs below show how replacing the scale or bypassing the scale would affect current operations. The trip down is shown on the left and the return trip on the right. The time saved by installing a bypass to the scale would have money and cut the round trip time almost by half.





CONCLUSIONS:

Further evaluations of each alternative as well as combinations of each was conducted to find the max capacity of LS&I's mainline. Below it can be seen that the construction of the Midway Siding would result in double capacity for LS&I, but would also be the most costly. Replacing the scale would be the least expensive, but would interrupt operations for several months. The option the group recommended is to construct a bypass track around the Pine Hill Scale. This would give some operational flexibility as well as helping to increase the speed over the scale on the return trip. Bypassing the scale would also give LS&I the flexibility to replace the Pine Hill Scale at a later time with limited operational disruptions.

Alternative	*Round Trips/24hr*	*Tonnage Possible*	*Cost*
Current (½ Production)	3	6 Million	--
Current (Full Production)	6	12 Million	--
Scale Replacement	8	16 Million	$250,000
Scale Bypass	7	14 Million	$850, 000
Scale By-Pass and Scale Replacement	8	16 Million	$1,100,000
Midway Siding	12	24 Million	$1,123,000

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