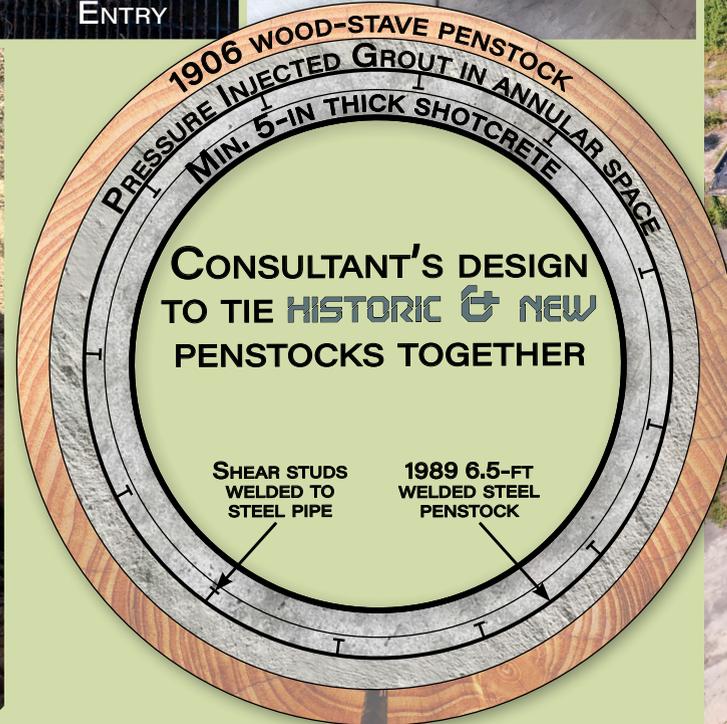
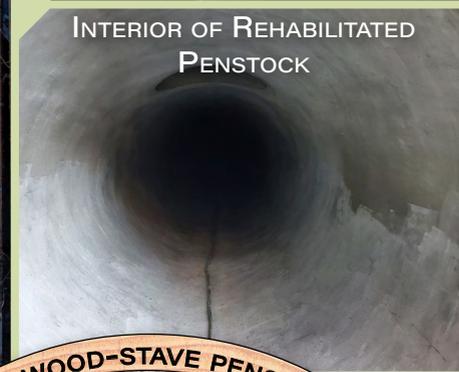
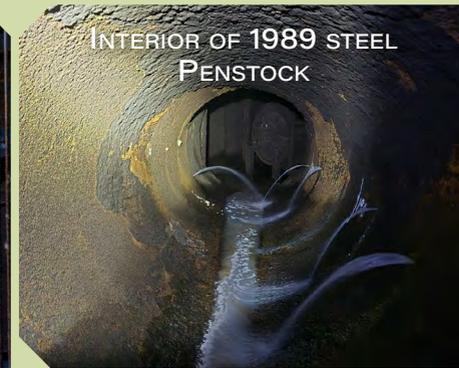
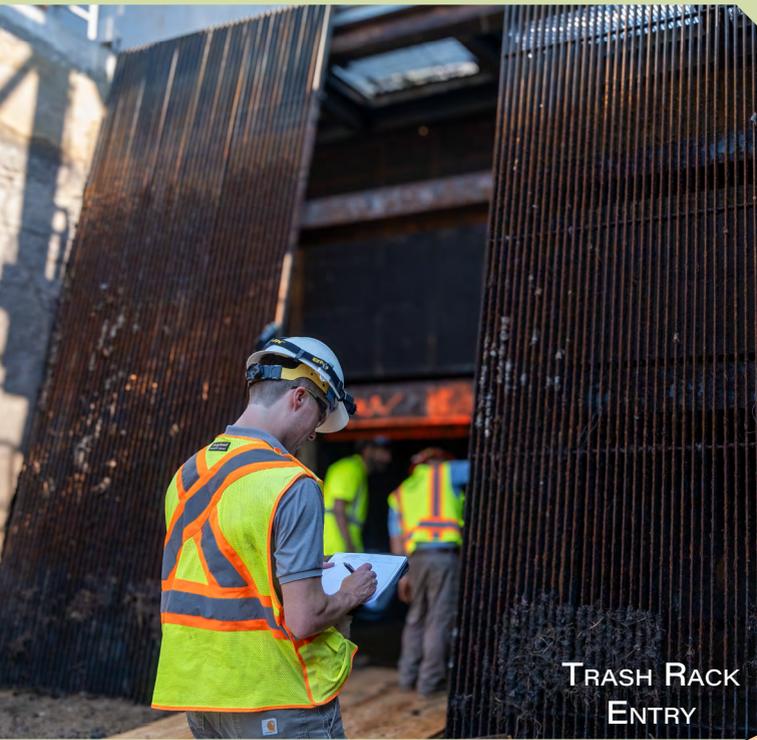


WEST HOPKINTON HYDROELECTRIC FACILITY PENSTOCK REHABILITATION

The consultant needed to develop a cost-effective design to rehabilitate two penstocks that run partially under NH 127. To meet regulatory standards, the consultant designed a reinforced shotcrete liner to be constructed inside the penstocks from a single access point at the trash rack without disturbing the traveling public. The design tied the new 5-in-thick shotcrete liner to the ca-1906 wood-stave pipe, the 1989 steel pipe, and the surrounding soil to provide structural support. A smooth interior coating decreased friction in the penstock, which avoided a substantial reduction in power production. The design met the client's goals to rehabilitate the penstock and maintain the facility's ability to produce power without disrupting the flow of traffic on NH 127.



GOALS

- + Determine a cost-effective solution.
- + Meet regulatory standards.
- + Substantially maintain power output.

COMPLEXITIES

- + Multiple layers of different types of pipes needed to be tied together to achieve the necessary strength.
- + Achieve substantially same output with smaller diameter pipe.
- + Single point of entry.

SOLUTIONS

- + Shotcrete pipe was chosen as the cost-effective solution to meet regulatory standards.
- + A manhole was added to facilitate future maintenance.
- + The design allowed the project to be completed without any disruption to the traveling public.

ANNULAR SPACE BETWEEN 1906 WOOD PIPE & 1989 STEEL PIPE