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lieve the paperwork we had to wade through and the extensive liability we had to agree to accept."

A 1,250-ft. spur extension, long enough to accommodate 20 gravel cars, was built to ARR specifications by Paul Watts, a contractor experienced in such work. Summit/COEXCO leased the necessary ties and rails from the railroad for the duration of the project.

The trestle consists of 36-in.-wide I-beams supported by seven steel pipe displacement pilings driven 40 to 55 ft. into the alluvial silt. Two 10-ft. corrugated culvert tunnels were placed under the trestle to protect two 48-in.-wide conveyor systems from falling gravel and rock.

A diesel-powered 248-kW generator powered a 100-hp. motor running each conveyor. The conveyor mouths were fitted with hydraulically operated gates to regulate material flow. McHenry said COEXCO and Summit risked spending $100,000 on the two conveyors, tunnels, trestle, pilings and related equipment on the faith that the whole offloading operation would work as predicted.

When word got out about this unique bid, bets cropped up all over town that the rail car plan wouldn't work and the joint venture partners would lose their shirts. As of mid-August, some 185,000 tons of pit run gravel had been hauled, unloaded and spread without major problems or delays in the railroad's or AS&G's schedules.

Des Jarlais admitted the possibility of derailment and scheduling snafus gave rise to some heavy-duty worrying at first. "The timing of the gravel train arrival at the jobsite, unloading and return was extremely critical. Alaska Aggregate Co., Central Paving Products and Anchorage Sand & Gravel all depend on one track for delivery of two trainloads of gravel each daily. To these six trains are added passenger and freight trains to and from Fairbanks and coal trains from Healy. If we fouled up and couldn't release our 80 cars on time, somebody stood to lose 7,000 tons of gravel that day.

"The train would hit our jobsite between midnight and 1 a.m. under normal scheduling. If we didn't have it back in the freight yard by 6 a.m., they would not be able to make the next run for another customer.

The mile-long train was separated into four segments for unloading. The 20 hopper cars per segment rolled backward over the trestle, unloading without stopping. It took about 35 minutes to unload each segment but switching times took up the majority of the four- to five-hour offloading period.

Nine areas of silt and clay were overlain with 50,000 sq. yd. of filter fabric. Trucks ferried gravel to the east side of the project for a period while repairs were made on the paddle-wheel scraper normally used for gravel spreading.

"We haven't fouled up with AS&G or the ARR once since this concept went into action June 20," McHenry said when gravel hauling was about two-thirds complete. "But we scared them a couple of times at first while overcoming various bugs and glitches. We started with seven carloads the first day, 10 cars the next, then went to 40 cars for a few days. Then it was up to the full 80 cars and we haven't missed a schedule with a full train yet."

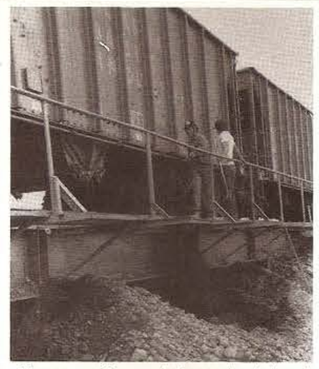
The twin conveyors handled about 4,000 tons per hour. Two Caterpillar D-8 dozers were used to pile the gravel away from the conveyor deposit area and a Cat 623 paddle-wheel scraper spread the material in 20-in. lifts over 50,000 sq. yd. of filter fabric rolled out on the underlying clay and silt. Each lift was roller compacted and tested for density. Gravel depth reached eight ft. in places.

"This was no dump-and-run operation," said Ted Kruth, engineer with USKH of Anchorage which designed the project. The unstable muck underlying the gravel is the same stuff that turned to liquid and took many Third Avenue buildings with it in the 1964 earthquake.

Knowing the muck would tend to move seaward under the weight of gravel and pavement, USKH and the contractor included a massive, anchored buttress along the 900-ft. toe area. This wedge-shaped strip contains 25,000 tons of pit run gravel pitched at a 2:1 slope shoreward. The idea is to provide a stable mass against which the filled area can push while settling. The buttress is designed to actually roll seaward somewhat over several years until the area behind it stabilizes.

The gravel mass is covered with heavy type II filter fabric, topped with an 18-in. layer of round armor rock and protected by a riprap breakwater requiring 20,000 tons of rock. Alaska North Trucking is hauling riprap from a Palmer quarry with end-dump trucks fitted with wood slats to protect the trailers.

The buttress has its narrow end starting at minus seven ft. mean high tide. This required digging a trench in the silt with a crane-mounted dragline and backfilling the excavated section immediately. This prevented the surrounding muck from filling up the trench and gave the crane the only solid footing available from which to work.



Close-ups of cars being unloaded and gravel moving over the conveyors on the jobsite. An operator mans remote hydraulic hopper gate controls which can shut off the flow of gravel to the conveyor belts if problems arise.

The $600,000 buttress is a vital but expensive portion of the job, representing some 20 percent of the costs associated with the project.

The entire nine-acre parking area was to be paved in September. AS&G will supply Summit Paving with 8,500 tons of asphalt. Des Jarlais expected the paving to take one week with a Barber Greene SA-41 paver applying a three-in. layer over a two-in. leveling course of crushed rock, crowned and sloped one degree for drainage.

Skyline Electric of Anchorage is putting in eight pole lights and associated wiring for parking area illumination. About 165 large concrete parking bumpers are being poured in place and perimeter fencing is being installed by other subcontractors.

Des Jarlais said he was holding his breath until the unique gravel hauling arrangement got rolling smoothly. "Bidding is tight this season and prices are as low as I can remember ever seeing them. The only way to get a profit now is to develop some kind of edge like using the railroad on this job.

"The straightforward contract where everybody has to use the same figures is forcing contractors to really shave their margins. But the jobs involving some complexities allow the contractor to seek out innovative techniques that save some bucks." □