

Crossing a creek in style



WESTBOUND freight leaving Spokane for Wenatchee and Seattle curves across Latah Creek bridge.

BN's sleek showpiece of the box girder technique

JOHN KALBACH

PHOTOS / BURLINGTON NORTHERN

1 ONE of the dividends of the 1970 merger creating the Burlington Northern was being able to pick a new, shorter transcontinental freight route from the merging roads. All publicity puffery aside, which road had the best St. Paul-Seattle route considering grade, distance, and traffic affected? Was it Northern Pacific's "Main Street of the Northwest" or Great Northern's route of the *Fast Mail* and legendary silk specials? The jury was impartial—its choice was NP from St. Paul, Minn., to Casselton, N. Dak.; GN from Casselton to Sandpoint, Ida.; NP from Sandpoint through Spokane, Wash.; and GN from Spokane across Washington to Seattle. So, GN fans, it was James J. Hill

by a . . . er . . . landslide, roughly 1400 miles to 400.

The route through Spokane, however, presented the young BN with one of its largest and most important projects. In many cities, you have to hunt for the railroads, but not in Spokane. They were, and still are, all over the place. The Big G crossed several downtown streets at grade and tied up automobile traffic, and its passenger station and facilities were on Havermale Island, which the city wanted for its Expo '74 World's Fair.

There were several route possibilities through Spokane for BN, all expensive. The one finally chosen kept the old NP line through town because it was elevated above street traffic, but it required the construction of two major bridges plus a 5½-mile-long line relocation (see map on page 33). The NP pas-

senger station was utilized (and still is by Amtrak). The new line, from the Northern Pacific to the Great Northern track west of the city at Lyons, would shorten the mainline route by 4 miles, eliminating several sharp curves and a long, wet tunnel.

THE biggest job was to cross Latah Creek Canyon (LAY-tah). There must once have been a Latah River, to judge from the size of this chasm west of the downtown area. It was already laced with bridges; besides two concrete highway spans, there were two steel viaduct type railroad bridges, one of which looks like a full-scale copy of the much-photographed Gassman Coulee bridge on the old GN main west of Minot, N. Dak. To complicate the proceedings, Spokane has an Allied Arts Advisory Committee and an ordinance backing it



BETWEEN, but higher than, adjacent highway bridges, BN's structure can become inconspicuous—the author almost missed it.

up that requires special approval to build structures taller than 150 feet. Even before the merger, the committee was concerned that the railroad might want to erect another steel viaduct in the canyon, and several meetings were conducted with BN planners to make sure everyone was thinking along acceptable lines—the committee's! Since the new bridge would be higher than existing highway bridges, the commission wanted it to be "architecturally and visually pleasing."

BN was as anxious to punch this project through as the city was (BN wanted to implement its new route, the city wanted to proceed on the Fair), and the railroad reached out for the latest in bridge technology, design, and materials. Pleased with the design, the city saw to it that BN got the green board for securing permits and rights of way. The design concept of the Latah Creek bridge, as well as the second major bridge in the project, over Indian Canyon, was the work of the firm Howard, Needles, Tammen & Bergendoff, consulting engineers on the project. The firm won six design awards for the bridges.

Structural steel was selected for the superstructure because it offered great-

er economies and required less construction time than concrete. A steel with the trade name of A-588 was used, which resulted in a savings in total weight because of its higher strength. Additional savings were realized since painting was not required, as the steel is of the "weathering" variety like the more-publicized Cor-ten steel, a competitive product.

THUS the Arts Commission, which didn't want a rusty old bridge, got instead a rusty new bridge! Its red color is actually rust, but once the weathering process is complete, there is no staining from it, either on your finger when you brush it or on the concrete piers from the washing action of the elements. There are cross-frames and stiffeners inside, and they are of weathering steel too.

At first, just a hint of rust was detected on one of the piers, and rust stains had to be contended with. The piers were cast in place using steel frames. The frames caused rust stains on the fresh concrete, but these were gently sandblasted off. There was also some rust staining from the A-588 steel itself before the protective crust was completely formed. The piers were shielded

during this curing period with a waxy spray coating.

The original plans called for hand-railings of galvanized structural steel, but the contractor asked for and got permission to use welded aluminum tubing, which is square in the cross-section. They have the look of nickel silver. This one simple touch puts the structure out of the utilitarian class.

The concrete deck of the bridge was cast in place and forms a cap which resembles a dish in the cross-section. This holds the loose rock ballast which forms the roadbed. Drainage is carried off the deck by pipes buried in the piers, which eliminates unsightly outside plumbing and the inevitable staining from leaky joints.

The designers literally threw bridge-watchers a curve. Students of such structures are used to seeing steel railroad bridges "curve" through a series of straight sections. Not on Latah Creek. Utilizing available construction methods, the spans could actually be made to curve, and the bridge is curved gracefully in the form of a wye, with the south leg heading toward Pasco, Wash., and Portland, Ore., and the north leg reaching across to the relocated main toward the GN line to Seattle.

The bridge is single-track, and there is a connection between the tips of the wye as if a rail connection was contemplated. This, however, is a bit of right of way formerly used by the Spokane, Portland & Seattle on its way into Spokane. The ballasted but railless link is used only as an easy access from one tip of the wye to the other.

I first "saw" the bridge in *Fortune* Magazine (February 1974 issue, "New Strength and Elegance in the Sinews of Construction"), wherein a spectacular color photo and a short description appeared in a portfolio illustrating ingenious new ways of building with steel. On my first approach to Spokane by auto from the west to see the bridge, in September 1975, I wondered if I'd have any trouble finding it. Well, I almost drove by it without realizing what I was looking at. The bridge is close to, and higher than, the highway bridge entering Spokane. I saw some rust-colored girders, but it didn't register that this was the bridge. You do get the full dramatic effect from the bottom of the canyon.

At its highest point over Latah Creek, this sleek showpiece of the box girder technique rises a towering 210 feet. Counting both wyes, it is 3860 feet long. (The smaller but similar Indian Canyon bridge is 900 feet long and 150 feet high.) The bridge sections were fabricated in Kansas City, Kans., by the Kansas City Structural Steel Co. and shipped by rail in 48 sections on a fleet of cars especially assigned to the service. The size of some of the units required very close clearance checks and special handling along the way. The girders were hoisted to the top of the piers by cranes on the canyon floor, which must have been a spectacular operation. Putting the girders in place was a tricky job, and one of the tricks was to deflect the piers slightly, dropping in the section, and then allowing the piers to spring back before welding the section in place.

Total cost of the Latah Creek Canyon bridge was 5.2 million dollars, and total cost of the relocation and consolidation project from Sandpoint to Lyons was about 18.8 million. Compare that with the 8-mile Cascade Tunnel, also in Washington, built by Great Northern in the late 1920's for 25 million. Latah Creek, perhaps reminiscent of a modern Keddie Wye viaduct in California, must now share the limelight with its Western Pacific (now Union Pacific) neighbor to the south.

Construction of the award-winning Latah Creek Canyon bridge began in January 1971, and formal dedication ceremonies were held on December 6, 1972, almost 3 months ahead of the target date for completion! I



"YOU do get the full dramatic effect of the bridge from the bottom of the canyon." Instead of a rusty old bridge, city got a rusty new bridge, without future staining.

