

escapes, but a round hundred went to their doom.

No other catastrophe from snow can equal that of the American Great Northern Railroad. Its swiftness and magnitude staggered everyone. A fortnight elapsed before the lines were opened to permit trains to approach the point, although rescue parties toiled over the snow-garbed flanks in the effort to extend succour.

Among the first to reach the fatal spot were Mr. James J. Hill, the chairman of the railway, his son, the president, and Mr. Hogeland, the chief engineer of the system. When they arrived the rescue forces were digging through the ice, rock, and tree trunks, striving to reach the mangled passengers in the splintered and pulverised coaches.

The officials tramped the track for miles and scoured the mountain sides above.

"Whatever the cost the track must be protected against a repetition of this disaster. If it means millions it must be done," declared the chairman emphatically. "Start at once!"

The chief engineer completed his reconnaissance, and then returned east, preparing, during his journey, his designs for snow-sheds which would defy the avalanche. In order to secure impregnability during the ensuing winter, delays were dangerous, so by the time the chief had regained his office he had matured his plans, and was ready to put the constructional forces to work.

He decided to introduce a new type of snow-shed. Over half-a-mile of line, in a continuous length, demanded protection, and timber was out of the question owing to the fire danger. As an alternative the engineer decided to adopt ferro-concrete.

The rescuers had barely dug down to the wrecked train before large gangs of men appeared upon the track above, commencing operations for the erection of the huge structure which was to enclose the

double track in a concrete tunnel. A matter of 3,300 feet of line was to be treated in this manner. All traffic was diverted over side tracks, so as to permit the workmen to continue their labours in gangs, day and night, without interruption.

A somewhat strange spectacle was presented when I visited the spot. The sleepy mountain town of Wellington—little more than a hamlet—was alive and bustling. The railway builders were setting the iron frames forming the metallic skeleton, the mixers were toiling incessantly preparing the gravel and cement, and the concrete as rapidly as it was mixed was dumped into the moulds, so that the structure was assuming its form with amazing speed. Down in the valley, where a few dirty patches of snow still lingered, were fragments and splinters of the train which had been hurled to destruction, while the mountain side was scarred with a wide swathe showing where the avalanche had mowed its way.

On the mountain side of the track the rock and loose earth were removed to permit of the erection of a huge monolithic bank of cement, armoured and reinforced with steel rods. On the opposite side, from concrete pedestals sunk into the ground, rose ribs of the same metal, a rod from each corner, and laced together about 12 inches apart. These were encased in wooden boxes into which the concrete was dumped and rammed tightly down, so as to form a homogeneous post of steel, cement and gravel. The tops of the posts were connected and interlaced with the steelwork forming the roof, which on the mountain side was anchored to the massive concrete wall. The latter is some 50 feet in thickness, and, being attached to the rock, forms practically part and parcel of the mountain. The roof of concrete, 10 inches in thickness, and sloping towards the canyon at one foot in five, is 22 feet above the rail level and covers both tracks.

Ferro-Concrete Sheds.

How the Sheds were Built.