

Midwest RRs fight the weather

Since February of this year, midwestern railroads have been subjected to sleet storms, tornadoes and floods. Most disastrous was the Mississippi river flood in late April. Although property damage will run into millions of dollars, signal and communications facilities came through relatively unscathed. For example, many roads reported pole lines down or flooded in some areas, but otherwise damage was slight. Reporting that Northern Pacific had no communications damage because of flood conditions, superintendent of communications Don Hill said: "I guess we must be living right up here." However a big factor is probably due to the relative ease with which S&C equipment can be moved away from flood areas.

Also, advance planning and prompt action by S&C departments helped to minimize flood damage. Most roads, alerted to possible flooding, followed the general practice of removing equipment from cases, bungalows, towers and offices before flooding occurred. In some instances, it was only necessary to raise cases or equipment a few feet to place them above the high water level.

Illinois Central's general superintendent communication and signaling George Pipas, in reporting to this *Railway Signaling and Communications* flood survey, said: "We were spared extensive damage in our facilities, as the only extent of the flood was through the Dubuque, Ia., yard area, which in most part is non-signaled. We did have a small amount of damage at an interlocking and a crossing protection installation. The major expense involved labor in removing or raising such items as switch machines, signal cases and batteries which was done prior to the crest, enabling us to save this equipment from damage."

Other railroads were not so fortunate, such as the Milwaukee Road.



Water covered Milwaukee Road's St. Paul, Minn., classification yard to a depth of about 8 ft. This is view from hump looking northward.

Storage tanks (below) were bled of air and filled with water to hold them down. Pneumatic tube line (far left) has sand bags at post positions for weighting.





When restoring MILW yard to service, switch engine was run over class tracks several times to wear off rust and restore shunting sensitivity.



Retarder tower was sandbagged to prevent debris from damaging building.



After water receded from retarders debris remained to be cleaned out.

Its St. Paul, Minn., automatic classification yard was under about 8 ft of water. In a major operation, the road's S&C forces worked 12-hr shifts about four days removing equipment to get it above flood waters. On April 12, the yard was completely out of service, after four days' work removing equipment and taking other preventive measures, such as placing sand bags to a height of 8 ft against the retarder tower's walls. On April 16, the flood crested at 26 ft, which was 12 ft above flood stage at St. Paul. By April 28, flood waters had receded to the point that S&C gangs were able to enter the yard. They replaced equipment, cleaned out debris

and had the yard back in service by 12:01 am, on May 5.

Like the MILW, the Burlington was affected by the Mississippi river flood at several locations. In practically all cases, signal equipment was removed prior to flooding. At the Green Bay & Western crossing at E. Winona, Wis., a CTC machine was removed from the tower, loaded into a box car and hauled to higher ground. The mechanical interlocking, controlling the crossing, was severely damaged due to flooding of the track. The roadbed was undercut, in some places to a depth of 30 ft. This mechanical interlocking will be replaced with an all-relay plant.

A. L. Essman, chief signal engineer, system, CB&Q, reported that in other flooded areas signal gangs removed switch machines, instrument cases at highway crossings where flashers and/or gates were in service, and other trackside equipment prior to the arrival of high water. At one interlocking where water had covered the tracks after removal of switch machines, the adjacent relay bungalow began to list due to the water undercutting its pile foundation. Fearing that the bungalow would topple over, and because a crane couldn't get in to lift it out, signalmen removed the relays and other equipment. With so little time, the wires to relays were cut with pliers, and men inside the bungalow tossed the relays to others outside. Relays were literally "relayed" from the bungalow to safe storage above water. In this case, the bungalow didn't topple, but Mr. Essman said they just couldn't take the chance that it wouldn't go.

MOVE EQUIPMENT

This was just one of several instances where removing equipment turned out to be unnecessary, but the cost of replacement plus the delay to trains and possible detouring for long periods of time made this rule apply: "If in doubt, lift it out." MILW signal forces removed a CTC machine from the Chestnut Street tower in St. Paul. Also, they removed storage units, relays and other associated equipment of a US&S type 504 code system. Equipment valued at approximately \$75,000 was removed to higher ground. Although the flood waters actually rose to only track level at the tower, the equipment was moved because of the possibility of flooding if a nearby dike did not hold. It held, but MILW engineers said they couldn't take the chance of having the equipment flooded.

In one section of CTC, CB&Q signal forces directed removal of the concrete bungalows at the ends of sidings. A work train was called out, and its crane was used to lift the bungalows into gondolas or flat cars. At these and other signal locations, batteries were taken out of battery boxes or wells. To keep the wells from "popping" out of the ground when flooded, they were

filled with water to help hold them down. A similar practice was followed by MILW signal forces at St. Paul yard. The air storage tanks and pipe lines were bled of air and filled with water to help keep them in place.

LINE WASHED OUT

At Winona, Minn., CB&Q had several sections of line washed out, including communications lines. Affected sections varied from 100 ft to 450 ft in length. T. W. Wigton, CB&Q, general superintendent communications, tells how communications was restored: "We laid two 3-pair direct buried cable for a distance of approximately 3,000 ft in the water. In other sections we resorted to pair wire, all of which gave us reasonably good communication, at least for our message and block circuits, which were badly needed by the crews making repairs to the railroad."

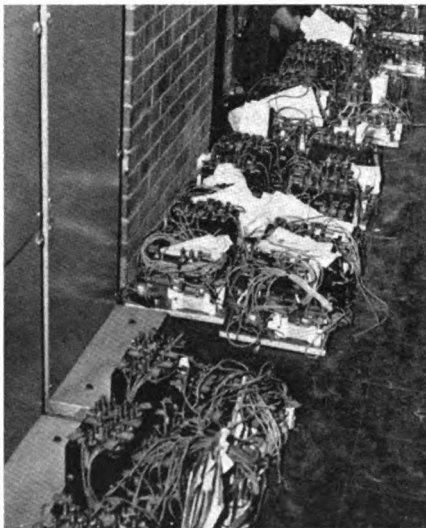
"At a small town on our Chicago to Denver mainline, near Gulfport, Ill., some 800 ft of the two mainline tracks were completely washed out and, of course, took the pole line with them. Again, to provide emergency service, we laid figure 8 cable over a 2,500 ft. section, some of it in the water, and where trees were available we strung it in the trees."

Estimated cost of material and labor for pole line replacement on the Burlington is approximately \$50,000 according to Mr. Wigton.

Chicago Great Western experienced flooding by the Mississippi at St. Paul and South St. Paul, Minn., and at Dubuque, Ia. Flood walls and temporary dikes placed across its tracks caused the road to suspend operation at these locations for periods of time. "Under these conditions," notes A. E. Smith, assistant general manager-chief engineer, "we were able to sand bag instrument houses and remove switch machines, relays, batteries, crossing signal mechanisms, etc., to a point high and dry, and then restore this equipment after the flood waters began to recede. By the time the waters had lowered to a point where flood walls and dikes could be opened to permit train operation, all equipment had been restored to service with only nominal loss or damage."



Sand bags were placed along side of the hump to prevent water from washing away soil and ballast. Here is removal of sandbags after water has receded.



Electro-pneumatic switch control valves were stored in tower.

Mr. Smith reported that CGW had no communication equipment destroyed or damaged. Some equipment was removed from low lying areas before flooding occurred and returned after the flood waters had gone down.

"We most assuredly depended on two-way radio particularly between mobile units to shorten the time in which it was necessary to remove and replace both signal and communication equipment during this time of disaster." These comments by Mr. Smith were echoed by many other railroad men. Some railroads used radio-equipped locomotives for base stations. Extensive use was



Retarder control valves are examined after water receded.

made of walkie-talkies by superintendents, trainmasters and other operating officers.

Illinois Central found radio a necessity in expediting its track raising, train operations and generally keeping the railroad open as much as possible at Dubuque, Ia., during the Mississippi river flooding.

E. H. Buelow, IC general manager, said that they had used Motorola two-way radio for every part of the track-raising and train-guidance operations.

"To organize our work teams when the water started getting higher, we began to use radio for dispatching and assigning work.

Once assigned, we would give the engineer and conductor a radio. The work train would move down the track looking for low spots in the railroad bed, or potentially dangerous side-track areas. The conductor would tell the engineer where to stop, and operations would proceed from there. Laying track and foundations for raising track is no easy operation, but because of radio, we saved manpower, and an even more important commodity at that point—precious time.”

Two-way radio also played an important role in the operational factor of trains moving through the flood area. Through an emergency center located in the IC freight office, an office accessible by boat, two dispatchers worked around the clock checking with two other radiomen, stationed at the east and west end of the flooded area. These supervisors had continuous contact with each other, the main station and men aboard the train who were warned of any possible trouble along the way.

“We would never have been able to coordinate these ‘items’ without radio,” said John Dodge, IC division superintendent. “We used it to help unload the slag used to build up the track, kept our communications open throughout the flood operation, and our stations at Wood Crossing and Dubuque Junction were all equipped with radio to control trains from beginning to end.”

WALKIE-TALKIES USED

The railroad used 11 Handie-Talkie units, and 5 Motran units to facilitate communications work. IC boats were also equipped with radio to follow track operations and to report back to the dispatch center at certain points along the route.

The electrical foreman was equipped with a radio that kept him in constant communications with the men along the line. As soon as trouble popped up, he went with a crew to the trouble spot to correct breakage and work hold-ups. The master mechanic and all IC division officers were also equipped with radio.

Not all flooding occurred in April. As early as March, Chicago & North Western was subjected to flooding of the Boyer river in western Iowa on account of an early thaw. Esti-



Relays removed from instrument case prior to flooding.

mated damages to signal equipment from this one instance were \$2,000 for labor and \$2,900 for material. Unfortunately, this was a prelude of what was to come later. Estimated flood damages including cost of removing equipment and taking other preventive measures, totaled approximately \$35,000 for C&NW signaling. All was not bad, the road had some near misses. For example, at East Clinton, Ia., the signal bungalow housing the control apparatus for the interlocking with the MILW was high enough to be out of the water, although the crossing itself was under water.

At Clinton, Ia., reports signal engineer V. S. Mitchell, the water was 2 ft deep in the maintainer's headquarters. This building houses the generator and batteries for operating the swing bridge over the Mississippi river channel. The batteries had to be raised to keep them out of the water. Outside this headquarters building, a new 60 cps to 100 cps solid-state converter unit for providing automatic train control energy had to be raised about 2 ft. The ATC system remained in service.

A major removal job was accomplished by MILW signal and communications forces at the road's St. Paul automatic classification yard. Because the yard is alongside the

Mississippi river, the danger of flooding was obvious. About the only question was—how high would the water rise? Alerted by Army Engineers about possible flood crests, a decision was made to remove S&C equipment from potential flooding areas. Electrical equipment located on the ground floor of the retarder tower, including electric motors associated with the air compressors were removed. Also taken out of the building were transformers, rectifiers, electric power panels and terminal boards.

REMOVE EQUIPMENT

Communications equipment was removed from the telegraph office that was located in the St. Paul yard office. Included were several carrier racks, teletype units, intercom and talk-back speaker consoles. Also, IBM equipment was moved from a ground floor room to storage on high ground.

Out in the St. Paul classification yard, electrical equipment was removed where possible. For example, the relays and associated equipment in instrument cases near retarders and power switches were removed. Also, the electro-magnetic control valves for the retarders and electro-pneumatic power switches were removed and temporarily stored on the third floor of the retarder building. Talk-back speaker heads and some signal heads were removed to prevent them from being flooded.

H. J. Dunn, supervisor signals and communications, directed the S&C men working on this removal, and later re-installation. General supervision of the operation was handled by W. E. Fuhr, assistant chief engineer signals and communications. Signal forces were under the jurisdiction of P. H. Linderoth, signal engineer, while D. H. Wylie, communications engineer was responsible for communications forces and their work. At other locations where equipment was removed it was carried out by S&C forces under the direction of the local supervisors, signals and communications. These men also supervised the reinstallation of S&C equipment, which generally required only cleaning and minor adjustments.

In addition to flooding at the yard, other areas in St. Paul re-

quired preventive measures to protect communications facilities. For example, the railroad's radio repair shop equipment in the roundhouse had to be removed and trucked to a temporary shop set up in Minneapolis. A telephone exchange including the automatic dialing units and carrier equipment had to be moved to a room in St. Paul's Union Station. Freight car number recording facilities were relocated to the east end of the yard out of high water.

Estimated costs for removing and re-installing S&C equipment is estimated to run in the neighborhood of \$50,000. Although many miles of pole lines were flooded, only a few poles were actually lost.

SLEET STORMS STRUCK

Floods were not the only natural disasters to hit midwestern railroads during 1965. Beginning in January, severe sleet storms struck with their disastrous heavy loading of pole lines. As might be expected communications lines suffered. In most cases twist pair or other types of temporary wire was run in to provide communications. Also, many roads leased facilities from Western Union, Bell System and independent telephone companies to provide alternate routes for voice, telegraph and data circuits. Signal circuits were also affected, where handled in open wire lines. C&NW's experience is somewhat typical of what happens when sleet storms strike. The road's signal engineer, V. S. Mitchell explains:

"In January this year, there was a severe sleet and ice storm which occurred on a Saturday afternoon and evening knocking out commercial power at various locations, but mainly on our Northwest suburban line, especially in the vicinity of Palatine and Barrington, Ill. Signal and crossing protection batteries began to run down after about 24 hr. It was necessary to use signal and track forces to flag at the numerous highway crossings on this three-track main line.

"In addition, there were numerous places where the signal pole line collapsed under the weight of so much ice. Commercial power service was not restored to the railroad at Palatine until Thursday morning. Meanwhile, the Engineer of Work Equipment supplied an Electromatic Tamper as a power source. One phase of this alternator was stepped up from 110 volts to the normal 440 volts for the distribution line. We began recharging batteries late Monday afternoon. Expenses for signal forces were labor \$23,000, material \$3,000, totaling \$26,000."

TORNADOES TOO!

Tornadoes have been visiting the midwest area, particularly in April and May. C&NW lost several short stretches of signal pole line on account of a tornado dropping down to earth near Crystal Lake, Ill. Estimated damage was approximately \$9,000.

Soo Line had some pole line damage due to tornadoes and high

winds, according to B. F. McGowan, assistant chief engineer, signals and communications. He reported that "a tornado damaged about five spans of our signal and communications pole line in the Minneapolis area. The damage was caused by trees blowing through or falling upon our pole line. Out CTC code line was restored to service within 4 hr, and other signal and communications facilities restored to temporary service within 24 hr."

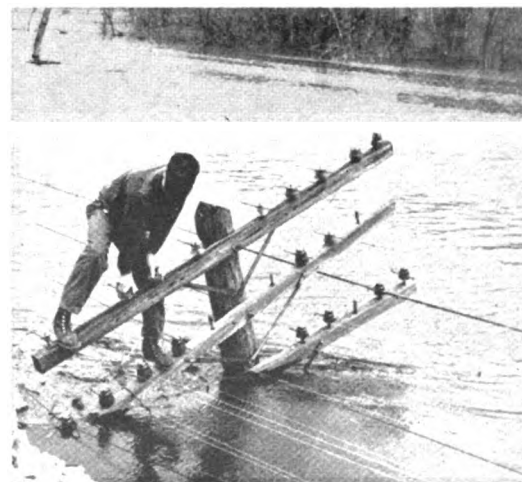
POLE LINE DOWN

Northern Pacific had only 19 communications poles leveled at the Northtown yard due to a tornado. On the signal side, A. J. Hendry, signal engineer, reported that approximately one-half mile of pole line was destroyed along the main track extending from North Minneapolis westward. He said that "damage occurred as one of the cyclones descended almost directly upon the pole line in the village of Fridley, Minn., just beyond the entrance to our Northtown yard. Considerable overtime labor was used to install temporary circuits and the line is now being restored to permanent condition. The cost will probably be of the order of \$10,000 for signal facilities only."

Nature sure has not been kind to us so far this year, is one signal engineer's comment. He, along with many colleagues, hopes it will be a long, peaceful summer. "We need time to dry out," echoes another signalman. By late summer, operations should be normal. **RS&C**



Rock Island line near Nahant, Ia., shows how pole lines may escape severe damage due to high water, unless there is a washout.



This pole line did not escape high flood waters.