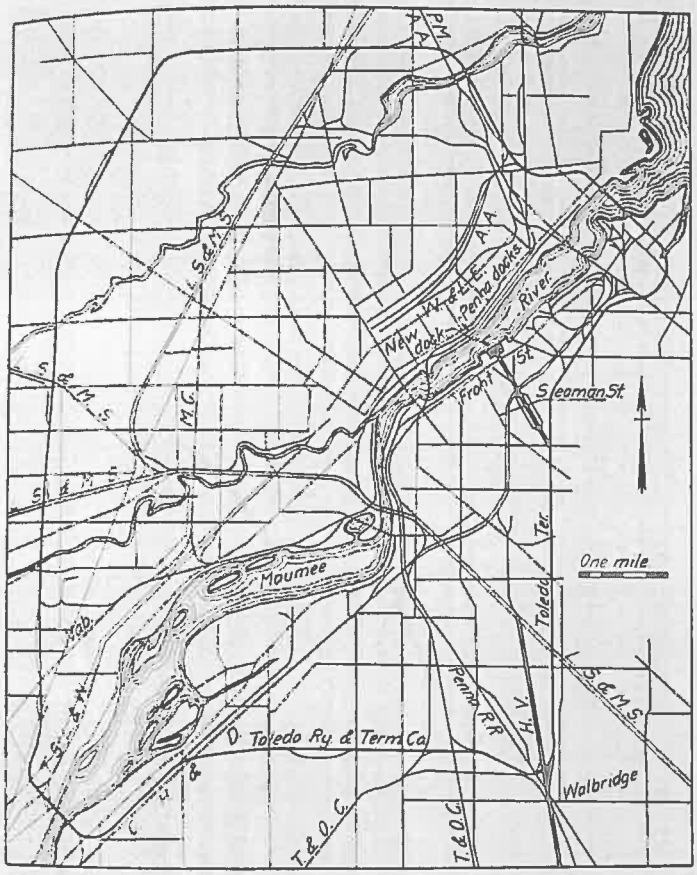
New Hocking Valley Coal Dock at East Toledo, Ohio

Providing Two Tipples, Each With a Capacity of 40 Cars Per Hour, and a 3,000-Car Yard and Approaches

The Hocking Valley Railway has had under way for some time a comprehensive improvement on the east bank of the Maumee river, at East Toledo, Ohio, to replace the coal and ore handling facilities formerly owned and operated by this company on the west bank of the river and reached over the tracks of the Pennsylvania Lines. The new terminal includes 1½ miles of running track approaching the dock, a 3,000-car storage yard, a coal-loading dock with two tipples, each having a capacity for handling 40 cars per hour, and an ore-loading dock, although the operating machinery for the latter dock has not been placed.



Map of Toledo and Vicinity Showing Hocking Valley Entrance and the Belt Line Used to Reach the New Dock

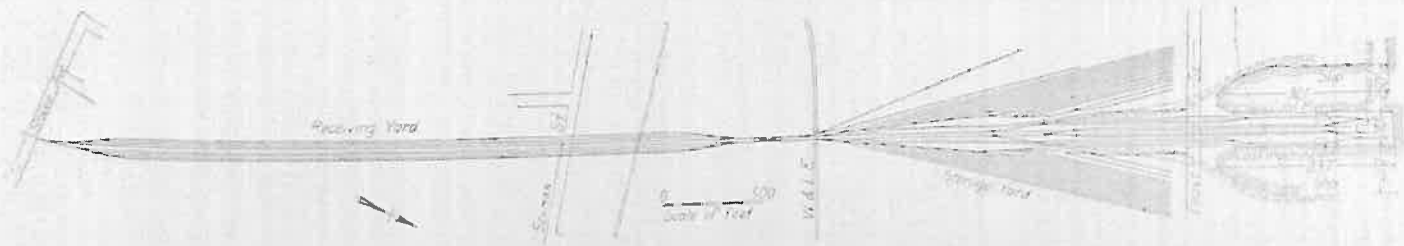
The Hocking Valley has been operating into Toledo over the Pennsylvania tracks since 1877. Until recently all of this company's freight trains crossed the Pennsylvania bridge over the Maumee river and used the Summit street yard and the adjacent dock frontage. Passenger trains entered by the same route until 1896, using a station located near the freight yard. In the last few years the passenger traffic has been diverted to reach the Union station over the Lake Shore & Michigan Southern. All freight, except coal, has also been diverted from the Pennsylvania tracks and is now routed to the Clover Leaf terminals. The present improvements, comprising new docks with independent approaches, is the last step in the removal of the Hocking Valley trains from the tracks of the Pennsylvania Company in order to reduce the congestion on the latter road. The contract between the two companies, covering the trackage agreement, contemplated the abandonment of the Hocking Valley dock and machinery to the Pennsylvania Company when the trains of the former road should cease to use the line and Summit street yard of the Pennsylvania, and the present dock development is in fulfillment of this agreement.

The coal trade for the Northwest, which is handled over the Hocking Valley to Toledo and loaded on lake boats at that point, is very important and it was essential in the design of the new dock that ample facilities be provided for the economical handling of increasing quantities of this business. The coal originates at about 95 mines along the Hocking Valley, the Kanawha & Michigan and the Norfolk & Western in the southern Ohio and West Virginia fields, requiring a haul of from 200 to 500 miles. The maximum tonnage handled at Toledo by the Hocking Valley during a single navigation season has been 2,700,000 tons, with a daily loaded car movement into the terminal running as high as 458 cars. The new dock facilities will make possible the loading of about 10,000,000 tons in a season, a vessel of 12,500 tons cargo, which is about the largest in use on the lakes, being filled in 6¼ hours by one machine. In addition to more than doubling the rated dock capacity, the improvement provides a much more direct line from the company's northern freight terminal at Walbridge, five miles south of Toledo, and a much improved yard serving the dock. The long, high crossing of the Maumee river is also avoided.

CONNECTING LINE AND YARDS

As shown in the accompanying map, the new dock will be reached from Walbridge by using about 3½ miles of the line of the Toledo Terminal railroad, an interchange belt line encircling the city, and 1½ miles of new line extending from the belt line to the river. This new line passes through a thinly settled section of the suburb of East Toledo, and on account of the commercial advantages of the location of the new dock in this portion of the city, the company was allowed to occupy certain streets with the understanding that other necessary streets be donated to the city. No grade crossings are involved in the new work, one street being carried under the tracks and one street and the tracks of the Wheeling & Lake Erie being carried overhead. In order to handle the additional traffic over the belt line between Walbridge and the dock connection, this portion of the road has been double-tracked.

The economical separation of grades at the crossings with the two streets and the Wheeling & Lake Erie was one of the principal problems in the location of the dock. The country adjoining the river near the dock is generally level with an abrupt river bank about 28 ft. high. In order to approach the dock at

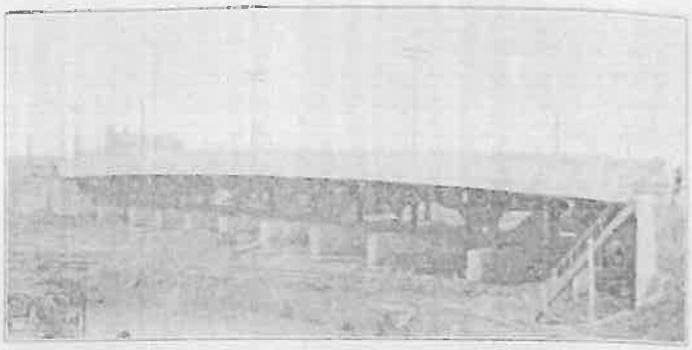


General Plan of the New Coal Pier, Yards and Approaches

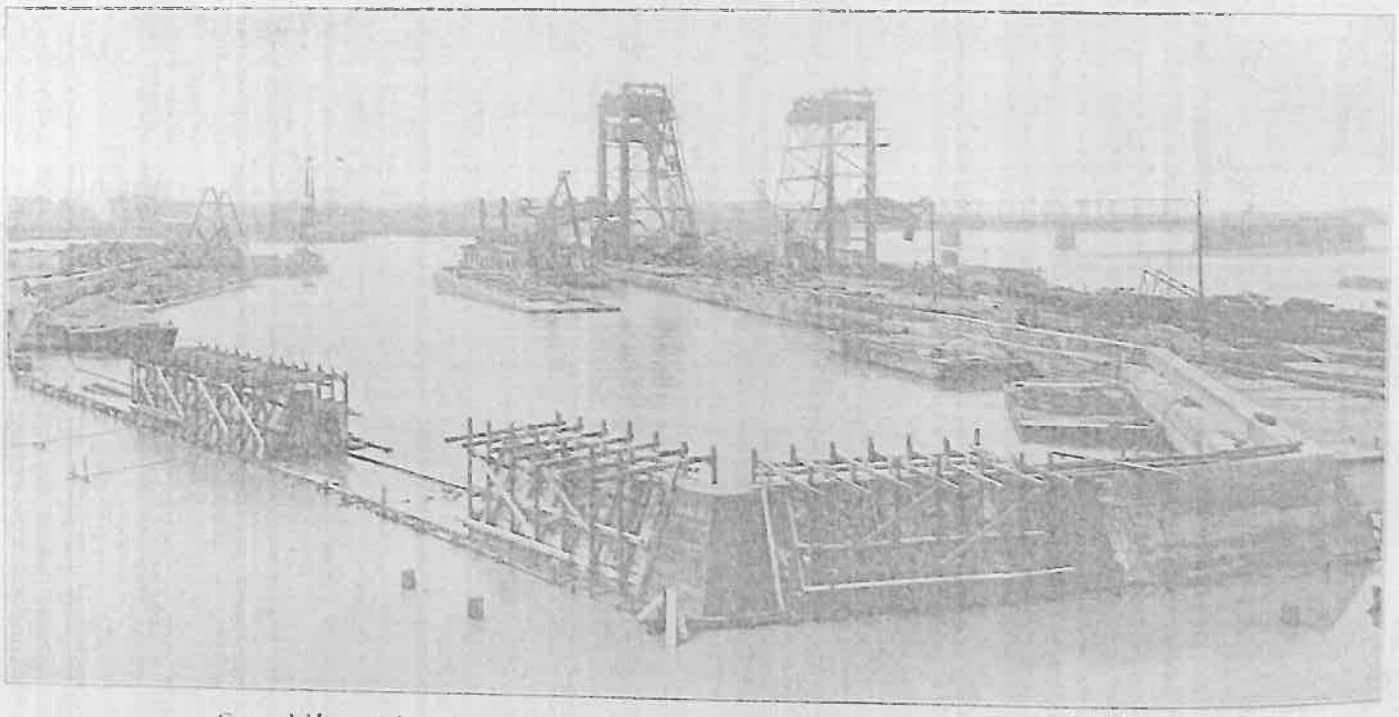
the proper grade a cut with a maximum depth of 21 ft. near the river was required, running out to the ground surface about one-half mile from the river. As Front street is parallel to, and only a short distance from the river, it was only required to be elevated about four feet to secure the necessary clearance over the new tracks. At the crossing of the Wheeling & Lake Erie the new cut is only about four feet deep, requiring the elevation of the Wheeling tracks about 16 ft. This fill was made of earth taken from the excavation made for the dock approach tracks, involving, in addition to the structure carrying the old line over the new dock connection, a subway to carry Seaman street under the elevated line.

A short distance beyond the Wheeling crossing the new line crosses a ravine 600 ft. wide and 35 ft. deep. This ravine is skirted on the south by Seaman street. A subway was built to carry this street under the tracks, and a reinforced concrete box culvert was constructed in the bottom of the ravine to the north of the street. This ravine afforded a convenient point to waste the material excavated from the adjacent cut.

A receiving yard occupies practically the entire distance between the Terminal belt line connection and the crossing of the Wheeling, and a storage yard extends from the latter crossing to Front street. Two running tracks extend through the center of these two yards to the dock. The receiving yard contains 8 tracks and the storage yard will ultimately have 60 stub tracks, although the development of this yard will depend somewhat on the growth of the business. The receiving yard has ladder connections with the running tracks at both ends, but the storage yard is fan-shaped, with ladders only at one end, this layout being necessary in order to lay the yard tracks practically on the original ground surface, while the running tracks are on a lower grade in the cut. The ultimate capacity of the yard will be 3,000 cars. The yard tracks are laid with 67-lb., relay rail, with 80-lb. rail on the running tracks and ladders. No. 8 rigid frogs are used on ladders of No. 7 angle. Manganese guard rails and frogs are used throughout.



The Front Street Viaduct Before the Tracks Were Laid Under It



General View of New Dock Showing the Two Dumpers and Slip Wall Under Construction

NEW DOCKS

The water frontage along the river is 1,600 ft. in length, of which 1,200 ft. will be occupied by the new coal and ore docks. The middle of the frontage is occupied by the coal pier, which is 170 ft. wide and about 900 ft. long. On either side of this coal pier is a slip 250 ft. wide and about 850 ft. long, in each of which four vessels can be docked. These slips are dredged to a depth of 23 ft. The down stream slip is only being finished to a width of 125 ft. at present, the remaining width to be completed when the ore dock on that side is required.

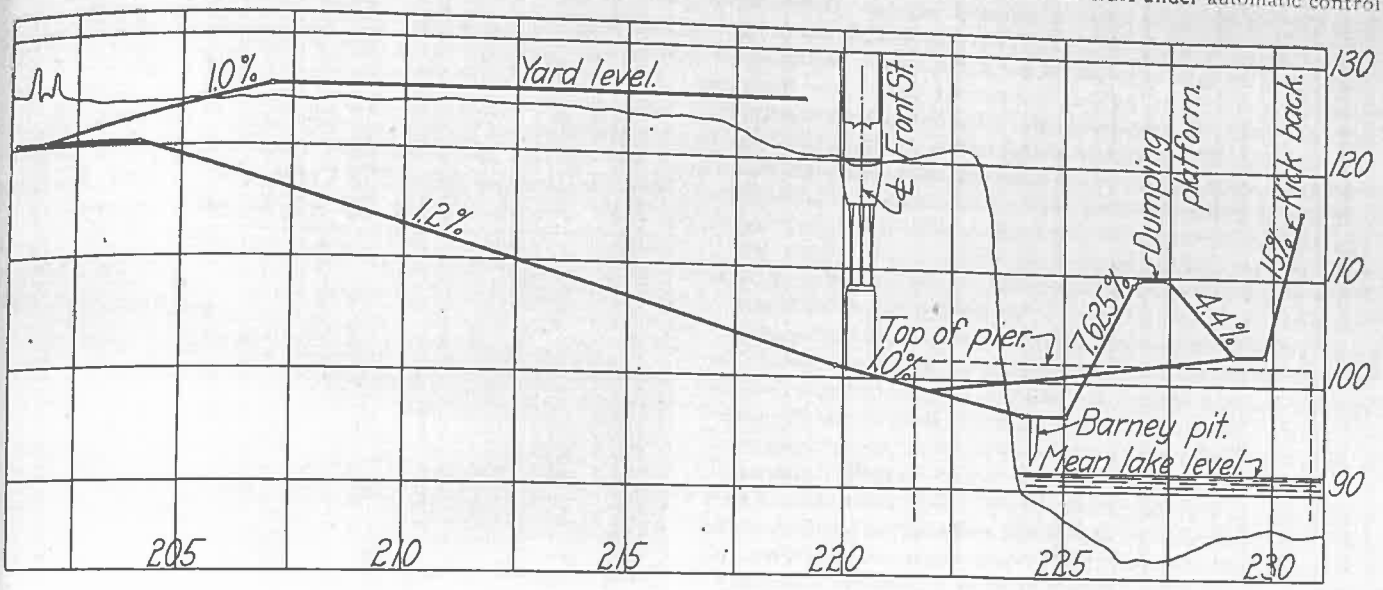
The dock wall surrounding the coal pier is founded on four rows of 45-ft. white oak piling, with a row of 30-ft. Lackawanna steel sheet piling driven just inside the second row of supporting piles, to retain the wet sand fill which forms the body of the dock. The dock wall is of concrete, reinforced in both directions, extending 4 ft. below mean water level and 10 ft. above it. The maximum width of the wall over the heads of the piles is 16 ft. 6 in. The side walls of the coal pier are anchored together by 2¼-in. tie rods, and the end wall is similarly anchored to pile clusters driven in the fill. The face of the concrete along the dock line is protected from damage of boats by the insertion of three 10-in., 25 lb. I-beams, flush with the surface of the concrete. Eye-bolts and rings for attaching guard timbers are located in recesses along the face of the dock. Cast iron mooring posts are spaced 50 ft. center to center along the dock face securely anchored to the concrete wall.

The wall enclosing the ore dock on the up stream side of the coal pier and across the slip is supported on cribbing. After the dredging had been done, heavy timber cribs built up of 2-in. by 10-in. and 2-in. by 12-in. timbers were floated into position and sunk. They were anchored in position by piling driven in the

inside corners and were subsequently filled with sand. On these cribs as a foundation a reinforced concrete wall, similar in general design to the coal pier wall, was built.

The two tipples located on opposite sides of the pier about midway of its length are of structural steel, occupying a ground area 40 ft. by 60 ft., and having a height of 100 ft. They are designed to handle any type of coal cars up to 52 ft. in length and 270,000 lb. in weight at a rate of 40 cars per hour. The

The power for the operation of the dock is generated in a power house, 42 ft. by 112 ft. in size, located near the end of the pier between the two switchbacks. It is divided by a fire wall into a boiler room and combined engine room and machine shop. The boiler room contains three Scotch marine boilers, 12 ft. 6 in. in diameter by 16 ft. in length, with a rated capacity of 375 h.p. each. Automatic stokers, suspended ferro-inclave coal hopper, feed water heater, pumps, and force draft under automatic control

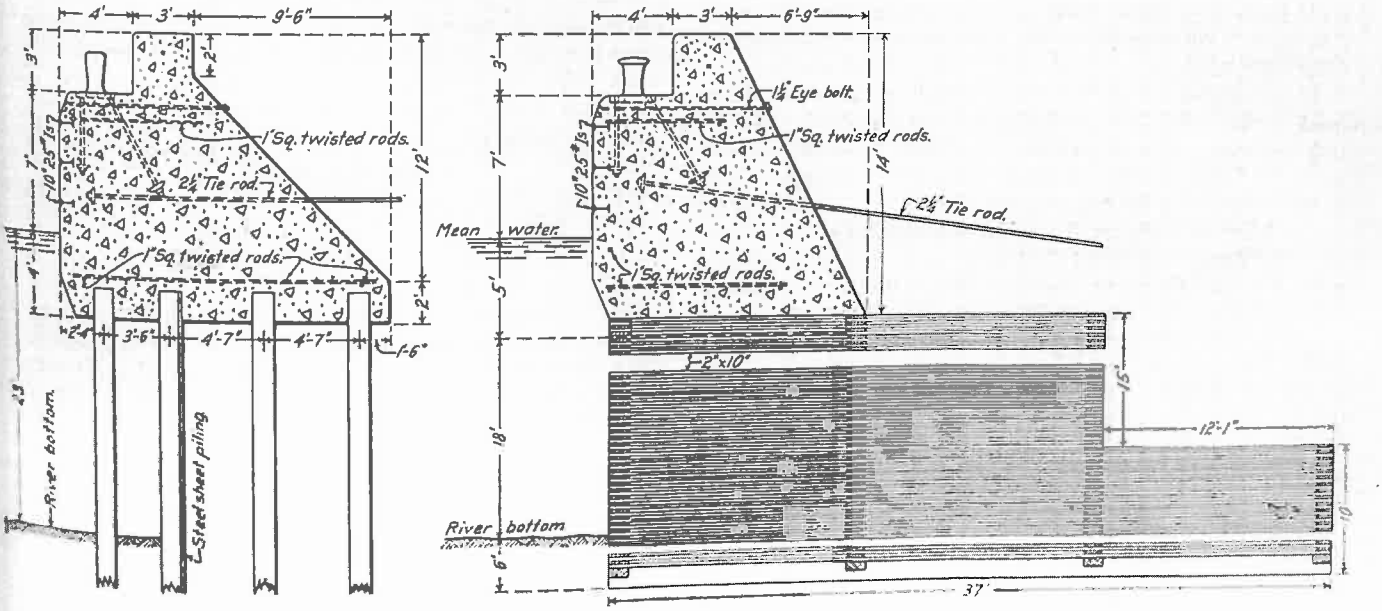


Profile of Tracks on the Dock and its Approaches

loaded cars are set down a grade of 1.2 per cent from the storage yard into three 20-car tracks for each dumper, the cars running singly by gravity from these tracks down to the foot of the tipple track incline. This incline has a grade of 7.625 per cent, reaching an elevation on the cradle 18 ft. above mean water level. The empty car run-off track on the other side of the dumpers has a grade of 4.4 per cent, ending in a switchback from

are provided. A separate spur track connecting with one of the empty tracks is used to deliver coal to a hopper serving these boilers.

The machine shop contains shop tools, lathes, planers, etc., necessary for making quick repairs. The engine room contains two 75-k.w. d.c. generators which supply electric current for lighting the dock and for operating the telescopic spouts on the



Typical Cross Sections of Dock Walls on Piles and Cribbing

which the cars go down an easy grade to two 30-car empty tracks for each dumper located between the tipples. A switch engine is able to place 20 loads and pull out 30 empty cars. The weight of each tipple complete is approximately 1,500,000 lb., the concrete footings being designed to stand this loading under the most severe strain.

dumpers. The steam required for the operation of the large steam engines, located within the framework of the two dumpers, is carried through large steam pipes in a 5-ft. by 6-ft. reinforced concrete tunnel about 260 ft. long. The power house is a brick structure with a 125-ft. concrete stack. The operation of each machine requires five operators, one oiler and 14 laborers. It is

estimated that 25 tons of slack will operate the power plant for a day when both dumpers are in operation.

STRUCTURES

The Scranton street bridge, carrying 12 tracks, is a two-span, through floor structure, designed to harmonize with a proposed boulevard development contemplated by the city. The floor troughs are 20½ in. wide and 21 in. deep, spanning from the abutments to the center support parallel with the tracks which cross the street at a slight skew. Concrete fascia girders are provided along the ends of the structure and the end columns of the center support are also encased in concrete to give the structure the appearance of a concrete bridge. The floor troughs are filled with concrete, with the exception that a line of 12-in. vitrified tile is laid in each trough to effect a saving in the amount of concrete and to reduce the dead load on the structure. The reinforced box culvert at the bottom of the ravine is 300 ft. long and has a 10-ft. by 12-ft. opening.

The bridge carrying the two tracks of the Wheeling & Lake Erie over the Hocking Valley is a through girder structure, a center girder being provided in order to allow the use of a shallow floor of 15-in. I-beams, spaced 10 in. center to center. The rails are fastened directly to these I-beams by Ritter adjustable rail clamps. The Front street viaduct is a steel structure encased in concrete, being 389 ft. long and 60 ft. wide. It is designed to span 10 tracks on the lower level and to carry a double-track street railway in a 40-ft. roadway with 11-ft. sidewalks on each side. Three-column steel bents with collision piers enclosing the bottoms of the columns support transverse steel girders, on which are supported the I-beams encased in concrete which comprise the bridge floor. An ornamental concrete balustrade is provided along the faces of the bridge to prevent pedestrians from falling over and to shut out the view of the yard below.

The grading work for this improvement required the handling of 400,000 yd. of material, most of which was a hard, tenacious, blue clay, which was very difficult to excavate and distribute. Explosives had practically no effect on it and steam shovels were able to make but slow progress. The dredging in the slips and channels out into the river involved the handling of 650,000 cu. yd. of material. The concrete in the bridge abutments, footing and piers amounted to about 7,600 cu. yd., and in the dock walls 25,000 cu. yd. All concrete on the work was mixed in the proportion of 1:3:5.

This improvement work has been carried on under the direction of W. Michel, chief engineer of the Hocking Valley; D. W. Smith, assistant engineer, and W. L. Roller, resident engineer. The Great Lakes Dredge & Dock Company, Cleveland, Ohio, had the contract for the construction of the dock and the power house and for the dredging. The Fritz-Rumer-Cooke-Grant Company, Columbus, Ohio, placed the bridge masonry, and the Toledo Bridge & Crane Company, Toledo, Ohio, and the Mt. Vernon Bridge Company, Mt. Vernon, Ohio, fabricated the bridge superstructures. The erection of the bridge was done by company forces. The grading was done by J. T. Adams, Columbus, Ohio, and the car dumpers were designed and erected by the Brown Hoisting Machinery Company, Cleveland, Ohio. The work was started in December, 1912, and the first dumper was ready for operation at the expiration of the company's contract with the Pennsylvania on July 1, 1914.

PEAT AS FUEL ON THE SWEDISH RAILWAYS.—The question of employing pulverized peat as fuel for locomotives has been under consideration by the Swedish railway authorities since 1909, and several experiments have been made with a view to ascertaining the cost of the material as compared with coal, and also its suitability for the various types of engines. One of the State Railway locomotives has been altered so as to employ the new fuel. This engine has now for some time past been used in regular traffic between Stockholm and Upsala with favorable results, both from the technical and economic points of view.

RAILWAY AFFAIRS IN OTHER COUNTRIES

For rather obvious reasons hardly anything has been allowed to leak out thus far regarding the railway activities on the European continent in connection with the present war. It is only possible, therefore, to obtain facts about the part that the railways are playing by correlating various items of information that may have appeared in the daily papers. The reports agree that the various administrations are performing the emergency duties put upon them remarkably well. The German railways, in particular, seem to have done some remarkable work. The railways of Belgium and France have not had similar burdens put upon them, but the engineers of the latter are now engaged in a reconstructive work of great importance. The French possess a very efficient and enthusiastic force whose duty it is to rebuild the damaged railways and bridges as the army moves forward. The organization of the body appears to be excellent. Particulars of all the destroyed structures, for instance, are known and arrangements have been made for the restoration of these structures as soon as the invaders have moved clear of them. The rebuilding of the Belgian railways may very likely also form part of the work to be accomplished by the French military engineers. It will be remembered that the Belgians despatched a considerable number of locomotives and cars for safety into France some weeks ago. The Germans also appear to have brought many of their troops across the frontier in their own cars.

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Railway Bridge Destroyed by Germans at Battle of the Marne

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The Northwestern Railway of India has recently completed a new locomotive repair plant which ranks among the largest of its kind in the world. The Northwestern of India operates about 5,000 miles of 5 ft. 6 in. gage track, and the new shops at Moghalpura near Lahore have been designed to handle the heavy repairs on about 800 engines. The pay roll numbers 5,000 men. The shops are laid out on either side of a 45 ft. transfer pit 1,160 ft. in length and will accommodate 80 locomotives, the output being 30 repaired engines per month. The principal building of the plant is 537 ft. 4 in. wide by 703 ft. long, parallel to the transfer pit, and is divided into 12 transverse bays. It contains the tender shop, erecting shop, fitting shop, machine shop, wheel shop, millwright shop, tool shop and brass finishers' shop. In a separate building near one end of the main building is located a foundry where both gray iron and brass castings are made. The iron foundry has four cupolas, the aggregate capacity of which is 20 tons of metal. Near the other end of the main building is the locomotive paint shop, a small building which will house six locomotives and tenders. On the opposite side of the transfer pit are located the stripping pit, the boiler