The Chicago & Eastern Illinois 1905 Improvements.

The heavy coal traffic of the Chicago & Eastern Illinois Railroad has for a considerable time past been overtaxing its motive power as well as the capacity of its track facilities, yards and main and side tracks to care for, classify and forward the car. For years, during the fall and winter months yards, sidings and passing tracks, for many miles south of Chicago, were blocked with coal trains and great delay resulted to main line movements from inability to care for and classify traffic at Dolton, the Chicago freight tcrm'nal. The rapid growth of this traffic and the volume



Coal, Sand and Ash Handling Plant at Coaler, Ill., C. & E. I.

attained by the end of 1904 are exhibited graphically in the accompanying diagram showing the ton-miles per year from 1894 to 1904 inclusive. Last year (1905) showed a corresponding increase over 1904, as indicated by the November record, which was 157,000,000, an increase of 13,000,000, or 8.3 per cent., over November, 1904. To meet the requirements of the situation, extensiva improvementa were authorized for the year 1905 on the Chicago division (Chicago to Terre Haute), as follows:

1. Second track construction on the section between Terre Haute, Ind., and Danville, Ill., aggregating 7.51 miles.

2. Construction of two miles of new double-track line to connect with the Chicago Southern (Danville cut-off).

3. Construction of a locomotive coaling, ash-handling and watering plant at Coaler, near Watseka, Ill.

 Construction of passing tracks between Terre Haute and Chicago aggregating 11.8 miles.
Construction of third track between Momence and Dolton,

5. Construction of third track between Momence and Dolton, aggregating 20 miles.

6. Construction of a new northward gravity yard at Dolton.

7. Remodeling of an existing yard at Dolton.

Installation of automatic electric block signals protecting 98
miles of main line between Bismarck Junction and Dolton.
Construction of 13 water softening plants on the Chicago

division.

10. Main line ballasting on all divisions.

Because the Dolton yard work is the largest and most important single feature in the foregoing list, and because these yards have already been illustrated and described in the *Railroad Gazette*



Coal, Sand and Ash Handling Plant at Coaler, Ill., C. & E. I.

(Sept. 15, 1905), they will be considered first. At the time of the previous article they were in process of building from plans which had been carefully worked out. Since their completion and putting in service a number of additions have been made to increase their capacity, efficiency and flexibility of operation. As it will be advantageous to know in detail of just what these changes consist, final plans of the yards are reproduced herewith. One of the most important changes was in the hump of each

One of the most important changes was in the hump of each yard, by raising the grade of each run-around track to the elevations

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snown; the northward yard having the knuckle of the run-around 1.27 ft. higher than the knuckle of the scale track. The primary purpose of raising the grade of this run-around track to its present height was to enable it to be used when the scale is out of commission or use of this track is blocked for some other reason. Also, it is for use on very windy days when the elevation of the scale track may be insufficient to carry the cars to their destination in the classification yard, the extra height of knuckle being for this special purpose. In considering the winter season, the profile of the regular scale track should naturally be arranged for the average winter day, the run-around taking care of weather of unusual severity. Practically the same thing is true for the southward yard hump, except that here both tracks have the same grades and elevations. In this case the large majority of the cars handled are empties. A level section at the summit will be noted. This is to provide for such adjustments in profile as may be found desirable. a the northward yard, another scale directly west of and close to the hump scale has been placed on a special track off of the running track. This is for live stock, it not being desirable to run live stock over the hump. One scale tender looks after both scales. The scales in both yards have the Streeter-Amet automatic weighing device.

It will be noted that the classification tracks in the northward yard connect at the north end to the running track, east of and adjacent to the northward main track. This running track in the former plan ended a short distance south of Frederick street, join



Diagram Showing Increase of Freight Traffic on the C. & E. I. in Ten Years.

ing the northward main at that point. There was one cross-over between running and main track about one-third of the distance from the south end of the yard. To facilitate deliveries to connecting lines and departures to the city yards the running track has been extended northward to connection with the interlocking plant at the P. C. & St. L. crossing, and cross-overs put in with the interlocked lines—P. C. C. & St. L., Chicago

interlocked lines—P. C. C. & St. L., Chicago Terminal Transfer and Chicago Junction railroads—to take care of freight movements into and out of the yard there. This arrangement minimizes the movements through the throat between northward and southward yards, which is across main line traffic, in making deliveries to foreign roads and to the city. An additional cross-over between the running and northward main tracks was put in about midway between the original one and the former end of the running track, and the latter was left in as a third cross-overs for a 50-car train, or three trains in all. The arrangement is such that any one of the three can be pulled out independently of the others, a feature of great convenience.

In the southward yard, the seven tracks west of the hump are new. The four marked

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"holding tracks for southward trains" are intended for use to relieve or clear the classification yard; as, for instance, if a train is made up but power for it is not immediately available, it is run on one of these "holding" tracks to await a locomotive. The coal chute has been extended 18 pockets, making 78 in all, 399 on each side. Two additional cinder pits, each 190 ft, long,

The coal chute has been extended 18 pockets, making 78 in all, 399 on each side. Two additional cinder pits, each 190 ft. long, were put in, the sand house capacity increased from 20 to 35 cars, the storage and oil room capacity doubled, a gasolene motor put on the turntable, and three additonal water cranes for locomotives

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put in, making a total of five in this yard. Careful attention was mence-Goodenow section involved 370,000 cu. yds. of earth, 3,300 given to the drainage of the cinder turntable and water crane pits and to surface drainage generally, to avoid a repetition of troubles experienced during the severe weather of last winter. Also to minimize troubles heretofore experienced from snow, three miles of snow fence was built along the west side of the two yards.

A series alternating lighting system consisting of a 100 h.p. high-speed Ideal engine and a 60 k.w. Fort Wayne alternating

generator, was installed to provide some 40 arc lights and about 250 incandescents. The power plant is adjacent to the roundhouse and the distribution is made through the vards on 35-ft. poles. Particular attention was paid to lighting the two humps. In the northward yard are 194 switch lamps cared for by three tenders having separate cabins as indicated on the plan. The southward yard has 132 switch lamps with two tenders at opposite ends of the yard. The terminal at present has a total of 54.7 miles of track.

Houses for the hump riders were built adjacent to the respective humps, the one in the southward yard having a second story for the yardmaster's office, from which he is able to see the entire yard. In the northward yard the yardmaster's office has a third floor, or lookout, for that purpose. A third story was added to the interlocking tower controlling the crossover between the two yards to be used as an office for the general yardmaster, from which he can overlook both yards.

Car movements over each hump are controlled by a semaphore operated by the man

in charge of the hump. Three special hump switching engines are being built for this service by the Baldwin Locomotive Works. They will be 0.8-0 type, weighing 220,000 lbs. total-all on drivers, of course. They will have 231/2-in. x 32-in. cylinders, 57-in. drivers, and carry 200 lbs steam pressure. Their tanks will hold 8,000 gals., to minimize the number of trips to the water crane. There will also be 14 0-6-0 switching engines for general yard work at Dolton, weighing 160,000 lbs., having 21-in. x 26-in. cylinders, 51-in. drivers, and 5,500-gal. tanks.

The assistant agent at Dolton has in his office a complete private telephone exchange with metallic circuit, having 18 connections to all important points about the yards and vicinity with which it is necessary to have quick communication, not including six connections within the office. There are in addition a private wire each to headquarters in La Salle street station and to 12th street freight house (the principal freight house), the latter being a new wire just put in on account of the volume of business between these two. The line out from La Salle street station has connections to the 33d and 37th street and Oakdale yards.

The next important feature of the improvement work is the third track connection between Momence and Dolton. By reference to the accompanying sketch map of the system, it will be seen that the traffic of the entire system is carried by this section of the line. It was here that the greatest congestion occurred as

cu. yds. of masonry, and the extension of numerous culverts. Included in the masonry are two reinforced concrete bridges of the flat-arch type, one containing 1,142 cu. yds. and the other 1,564 cu. yds. The former is Bridge 476, crossing Trim creek, a view of which is shown herewith. The shorter section of the third track work, from Thornton Junction to Dolton, was done in connection with the Dolton vard work. This track enables northbound freights



Concrete Bridge No. 476 Across Trim Creek, C. & E. I.

to enter Dolton yard without disturbance to main-line traffic, and

under the protection of the Thornton Junction interlocker. The second item given in the list of improvements is the construction of a double-track connection to the line of the new Chicago Southern just south of Bismarck, by means of which a cut-off between Bismarck and Brewer, around Danville, is obtained. The situation will be clear by reference to the accompanying map. The line of the C. & E. I. into Danville from the north has considerable heavy curvature in it. The line to Terre Haute, in getting out of Danville, runs due east for about two miles, crossing the Chicago Southern just before entering Brewer yard. Therefore, by building the connection south of Bismarck mentioned and using jointly with the Chicago Southern the 6.44 miles of its double-track line between these points, a distance of 2.28 miles, is saved and a ville will be avoided by through freights. The connecting line is approximately two miles long, with a maximum gradient of 13 ft. to the mile and curves not exceeding one degree.

With the building of the 7.51 miles of second track from Newport to Hillsdale on the Danville-Terre Haute section (the first item in the list) the C. & E. I. is now continuously double-tracked from Chicago to Clinton, Ind., 163 miles. The improvement work also involved the construction of 11.8 miles of new passing tracks between Dolton and Terre Haute. Seventy-car tracks were provided



Gravel Pit at Lyford, Ind., C. & E. I.

described at the beginning of the article, and an extra track be- for northbound trains, and 90-car tracks for southbound. came a necessity. At first it was the intention to build this track through from Momence to Dolton, 33 miles; but after careful consideration it was decided that by extending it from Momence to the summit of Goodenow hill, 17.2 miles, building a long passing track at Chicago Heights, and putting in a third track from Thornton Junction to Dolton, 2.8 miles, the requisite capacity would be provided. This made a total of 20 miles of third track. It was built with a maximum gradient of 1/4 of one per cent. The Mo-

Where a northbound and southbound siding occur at the same point, they are connected by a facing and trailing interlocked cross-over.

On the Chicago division there were formerly eight interlocking plants for protecting grade crossings of foreign roads. Eight new interlocking plants for handling the double cross-overs mentioned in the preceding paragraph have been added. Also 98 miles of double track between Dolton and Bismarck Junction are being equipped with electric automatic block signa's. They are the three-



position, normal clear system, worked by primary batteries. A drawing of the circuit, which is a polarized line circuit, is shown herewith. By this arrangement—use of a polarized relay for working the distant signal—a line wire to the distant signal is saved.

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The average length of blocks is approximately two miles, but they are shorter approaching junction points and interlocking plants. The interlocking home signals are three-position, and the full, clear position of the main-line interlocking home signal is dependent on the block ahead of the interlocking. The interlocking distant signals also are three-position, their indications being governed by the home interlocking signal. When the distant signal is in the full clear position it locks up the route through the interlocking.

In October, 1905, the manual block signal system was installed on all single and double track not having the automatic signals, where through trains are operated. American Railway Association manual block signal rules are used. To establish this system, it was necessary to string an additional block wire from Woodland Junction to Pana, 122.6 miles, and from Bismarck Junction to



Map of Danville Cut-Off, C. & E. I.

Terre Haute, 63 miles. Although these signals are controlled manually, on single track they are electrically locked by a specially devised machine in a manner which makes it impossible for an operator to pull his signal to clear until the operator at the other end of the block has unlocked it for him. These locking machines are of a type not in use on any other railroad. To operate them there is also an insulated iron wire covering the entire territory. The capacity of the telegraph department also had to be in-

The capacity of the telegraph department also had to be increased materially, and between July and January new wires were strung as follows: St. Elmo to West Frankfort, 80.6 miles; Lyford to Terre Haute, 13.4 miles; Bismarck to Danvil.e, 9.9 miles; Terre Haute to Danville, 54.4 miles; Terre Haute to Findley Junction, 82 miles; Danville to Rossville, 18 miles; Woodland Junction, 82 miles; Danville to Rossville, 18 miles; Woodland Junction to Pana, two wires, 254.2 miles; Chicago to Terre Haute, 178.8 miles; Danville to Woodland Junction, via Villa Grove, 105.5 miles; Thebes to North Junction, 4 miles; total, 791.8 miles. To this should be added 500 miles of wire for the automatic signals; also telephone



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STREET

MAIN

watering facilities, was built at a point about two miles south of structure is of steel, and the pocket itself of heavy wooden con-

wire in Dolton yards and at block stations, which brings the total views of the plant, which is of the belt conveyor type, are shown. amount up to 1,424.3 miles. The coal storage bin has a capacity of 700 tons, and extends A complete new plant, embodying coaling, ash handling and over four tracks, two main and two passing tracks. Its sub-

> struction. The coal is received on a track at one side of the pocket, which is on a slight grade and contains a concrete steel-lined hopper about 190 ft. from the pocket. The coal cars, which are of the side-dump type, are pushed beyond this hopper and are then dropped back over it by gravity and dumped. At the bottom of the receiving hopper is an automatic feeder, which carries the coal in a steady stream to a small hopper above a large belt running at an angle of 20 deg. This belt conveys the coal to the top of the storage pocket at the rate of 100 tons an hour. As the belt turns over the head pulley, the coal is discharged into a small steel hopper, from which it is delivered to a belt running horizontally for distribution over the four tracks. Distribution to the tracks is governed by an automatic belt tripper. This tripper runs on a track below the belt, and is self-propelling in



+2.5 Present Grade Line Direction Grade 0.0 Base of 1 Hump. Profile of Electric Light YARD RECEIVING CLASSIFICATION YARD REDERICK R. R. Cos Coal 10 Car

Middle Section of Southbound Dolton Yard, C. & E. I. (This section joins with 1 and 4.)

STREET

TH 147



South End of Southbound Dolton Yard, C. & E. I. (This section joins with 3.)

Watseka, now named "Coaler." This is north of Woodland Junction, and so accommodates the trains of the St. Louis division. This plant, which was designed and built by the Roberts & Schaefer

The green sand passes out through the center of the conical bottom, by gravity, through a stove dryer beneath, from which it flows on to the floor of the drying room, and thence is passed through a screen Company, Chicago, has a number of novel features. Photographic into a large steel air tight tank or drum. From the latter it is

either direction. As the belt approaches the tripper it rises on about a 20 deg. incline to a

small pulley on the tripper. Passing over this pulley, it reverses around another pulley lower down and discharges the coal into a chute at-

tached to the tripper, from which it passes into

the bins. A hinged apron and an undercut gate

over each track discharge the coal to locomotives. The large conveyor belt also handles the green sand. The sand is dumped into the receiving hop-

per and handled in the same manner as the coal

until it reaches the small steel head hopper. In this hopper is a swinging gate, which in one position discharges to the horizontal belt and in another, as in the case of sand, discharges through a large steel pipe into the top of a large reinforced concrete tank having a storage capacity of 100 tons. This tank has a conical concrete bottom beginning about 16 ft. above the ground, while

the outside shell continues to the ground to form

a drying room beneath the tank, 12 ft. in diameter.

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