

Ford Railroad Has Unique Operating Practices

Transportation principles same as on other roads—Innovations in administration prove worth

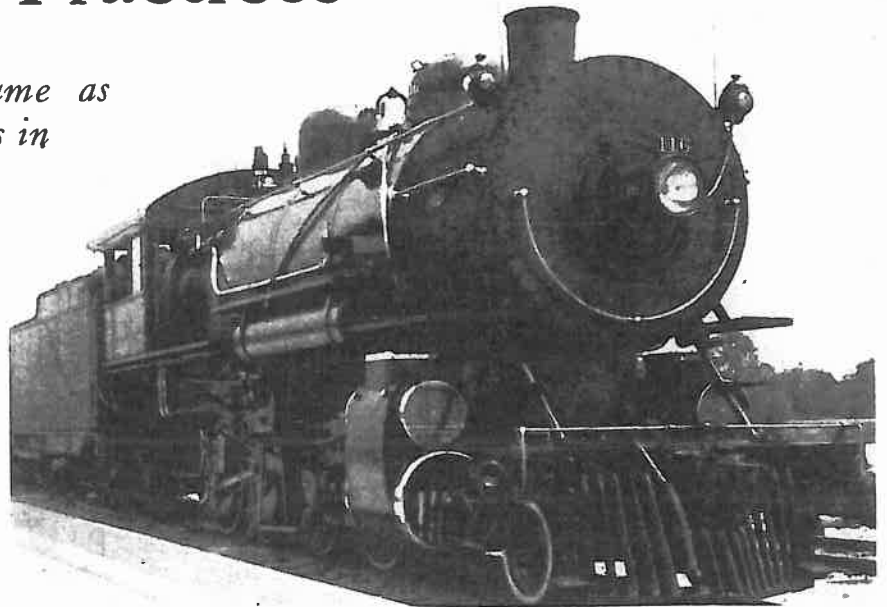
WHEN Henry Ford assumed active control of the Detroit, Toledo & Ironton railroad, in March, 1921, he entered the field of railroad operation, a new one to him, with a point of view entirely different from that held by many railroad executives. He paid \$5,000,000 for the property, not particularly because he wanted to enter railroading, but, as he is reported to have said, because certain property of the D., T. & I. stood in the way of the development of his motor plants. Then, not content to allow the D., T. & I. to remain the run-down property that it was, he turned his attention to building it up so that it would be able to render efficient service in the true meaning of the term.

To manage the new property, he did not summon the previous officers of the D., T. & I., or other railroad officers, but rather picked men from his own organization. These men have also approached railroading with a new viewpoint. They are specialists in organization, and have not been bound by precedent but, on the contrary, have



The Typically Clean and Neat Ticket Office at Ironton, Ohio

been free to exercise theories and practices which have proved successful in the Ford Motor Company. A new departure in railroading was expected and the results have been closely observed by the railroad world, with the possibility in mind that men working on the railroad problem from a new angle might secure results of far-reaching significance. To determine what results had been attained, two members of the editorial staff of the *Railway Age* have gone over a large part of the D., T. & I. to study prevailing practices at close range. To outward appearances, the Detroit, Toledo & Ironton is not unlike most of the other railroads of the United States, but there have been introduced on the D., T. & I.



D. T. & I. Locomotives Have Nicked Fittings

a number of departures from ordinary practice, although there is nothing that might be considered revolutionary, as Mr. Ford and his associates have of necessity followed the standard operating methods in general. Many worth-while and copyable innovations are to be seen which may be grouped under these broad principles: (1) to operate with the simplest possible administration; (2) to pay wages commensurate with the character of service rendered and sufficiently high to attract desirable men; (3) to insure that every employee is surrounded by a wholesome environment; (4) to maintain neatness and orderliness; (5) to keep every man busy; (6) to avoid waste of every form; (7) to instill safety into every operation. By the application of these principles, the physical condition of the D., T. & I. has been and is being



The D. T. & I. Identifies Its Crossing Viaducts

improved considerably; its employees are diligent and contented and its patrons are apparently well pleased.

A General View of the D., T. & I.

The Detroit, Toledo & Ironton has a total mileage of 468 miles. Its main line extends from Detroit southward to Ironton, O., a distance of 379 miles. A small portion of this is over line that is rented. Branch lines extend from Dundee, Mich., to Toledo, Ohio, 22 miles; Sedalia, Ohio, to Kingman, 31 miles; Jackson, Ohio, to Cornelia,

18 miles; and Lisman, Ohio, to Bartles, 2 miles. The Detroit & Ironton Railroad, a subsidiary, has laid double tracks from a Detroit connection to Flat Rock, Mich., 14 miles. This line is the model to be followed in construction of roadbed in the future, and will soon be electrified. The road has nearly completed installation of a modern telegraph and telephone circuit, to be used in addition to its present radio facilities. Physically, the position of the D., T. & I. is unfortunate, since its grades are heavy to a large extent, the curves numerous and the cities local to it do not originate a very large volume of traffic. Springfield, Ironton and Lima are the only industrial centers of note besides Detroit on the D., T. & I. It is interesting to note that 60 per cent of Springfield's industries are located on the D., T. & I. In another respect, however, the D., T. & I. is fortunate: it crosses nearly all of the larger east and west trunk lines between Detroit and the Ohio river.

The new administration was faced with the necessity of thoroughly rehabilitating the plant. The program as outlined called for maintenance at a high standard and the acquisition of such facilities as would speed up operations.

The work of reballasting the entire line was begun; 90-lb. rail replaced that of much lighter section. Since approximately 80 per cent of the D., T. & I. business is handled north of Springfield, the first improvements were made on that portion of the line.

A number of cut-offs are contemplated to reduce distance and eliminate heavy grades and curves. One of these, connecting Durban, Mich., and Malinta, O., 56 miles long, double tracked, will have only slight grades and two easy curves. This will shorten the present route by 20½ miles and cut more than two hours from the present running time of freight trains. At one end of the Detroit & Ironton cut-off, near Flat Rock, a 3,700-car yard is under construction, with extensive engine and car shops. Among other things, this yard will serve to help relieve the rather limited yard facilities in Detroit.

From 2,700 to 3,400 cars, empty and loaded, are handled on the D., T. & I. daily, including about 1,200 loaded cars out of Detroit. Slightly more than half of this is freight of the Ford Motor Company, including cars and parts and coal and raw materials.

Administration Is Kept Simple

Titles, except those required by law, were abolished in reorganizing the D., T. & I. administrative department. The plan was to build a flexible organization, one which would develop the officers' individual initiatives and, more important, abolish red tape. Consequently, there are fewer officers than might be expected on a road of the size of the D., T. & I. Several departments have been abolished or reduced to mere skeletons. Otherwise, the officers and present administration are not unlike those on most roads.

The executive officers are: Mr. Ford, president, and E. G. Liebold, vice-president in charge of operation, both of whom fill their positions by reason of their general supervision over all Ford Motor Company operations. F. L. Rockelman is vice-president and general manager. G. R. Brubaker is secretary and treasurer.

The road is divided into two divisions, the Northern and Southern, each under a dispatcher. The Northern division employs two trainmasters and the Southern division, one. There is one roadmaster, who is the ranking maintenance officer. Local supervisory officers have duties similar to those of corresponding officers on other roads, with different titles in some cases. Only one clerk is employed in the maintenance department. Such work as may involve engineering of considerable magnitude

is handled by a staff under the officer in charge of engineering for the Ford Motor Company.

Mr. Brubaker, secretary and treasurer, receives reports of the accounting and claims department in turn deal with the forces along the line. The accounting department, with a small staff consisting of 80 persons, does the work formerly done out along the entire line. This was accomplished by extensively simplifying and systematizing the methods of bookkeeping and making reports. The station agents prepare only three different statements for the accounting department, namely: (1) statement of cash collected; (2) report of tickets and (3) draft statement, if any drafts are taken over by the general accounting office. It was necessary for station agents to prepare a copy of waybills received. Now the waybill is forwarded to the general office where it is entered by machine in the station ledger, and simultaneously the same entry is made on the abstract used to divide and settle charges between railroads. Any increase in the personnel of the accounting office has been more than offset by the decrease in the number of stations, not to mention the fact that the station employees are now much freer to devote more time to other duties such as freight solicitation. Further to expedite the system, all of the stations have been equipped with standard file cases, so designed that the correspondence and the tariff files will correspond in all the stations. This not only does this facilitate the work of the traveling agents but also the work of agents who may be transferred from one point to another. All station records are now in three filing sizes, namely: standard interchange waybill size and freight bill size.

The legal department of the D., T. & I. is of small proportions, and shows a monthly expense account of about \$200 for handling legal matters. The train and commercial departments have a personnel which, if combined, would number 25 persons. The commercial department has charge of assisting new industries to be located on the D., T. & I. Local freight agents at Springfield, Ironton and Lima act as district freight agents.

Methods and Facilities Highly Standardized

Shop practice is standardized in every possible way. Locomotive and car parts have been divided into classes and repair work standardized for each class. Patterns have been made of these standard parts and parts manufactured and distributed to shops where they are stored in standardized stock rooms. More than 10,000 blue prints of such parts have been prepared and filed. The stock rooms at all shops store these parts in identical compartments, thus permitting an index system to be evolved. Running repairs are made at all shops under an officer of the mechanical department. Heavy repairs are made at the locomotive erecting shop at the Ford River Rouge plant. A foreman of the shop supervises the motive power. Roundhouses are located at South Yards (near Detroit city limits), Lima, Springfield, Jackson and Ironton. The yard being built at Flat Rock will include a roundhouse.

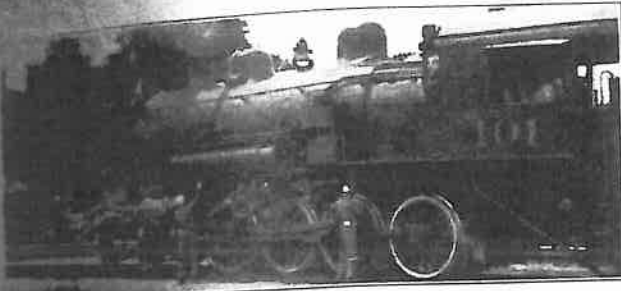
Road Pays High Wages

The wages paid D., T. & I. employees are considerably higher than those paid for corresponding positions on other roads. The essential consideration, however, is that Ford wages go only with Ford methods.

Customarily, the wage for beginners is \$5 a day and is increased automatically to \$6 after 60 days. The general practice of the company is to pay employees in proportion to the quantity and quality of their work.

Vol. 74, No. 9

theoretically there is no maximum rate of pay for an employee, but in practice maximum and minimum rates are set for each class of service. Typical of wages now in effect are the following: engineers and conductors, \$200 to \$375 a month; firemen, \$200 to \$275 a month; machinists, \$6 to \$8 a day to \$250 a month; laborers, \$6 a day. Thus maintenance of way wages of engineers are ordinarily increased by \$25 as they qualify for recognition, the most important considerations being ability to run trains according to schedule, freedom from accidents, a good discipline



While Trains Are Waiting, Crews Polish Bright Work on Locomotives

and interest in the care of the locomotive in his charge.

The employees are not on piece work but are paid by the hour. They are expected to do their best, at least to fall below a certain standard. Recommendations by foremen or immediate supervisory officers are the chief considerations in fixing the employees' rates within the allowable range.

The practice of attempting to pay each man what his services are worth naturally leads to different rates for men working side by side in the same group or gang. An attempt is made to limit the number of men receiving higher rates in a gang; all are encouraged to strive for the maximum. It is felt that a man earning the higher rate is more economical as he will be more efficient in the use of time and material. The differential between the wages of foremen and their men is relatively small. An apprenticeship system exists on the D., T. & I.

Employees in other than train service are on duty eight hours a day during the week, with a general shut-down on Sunday. The only employees at work at all on Sunday are those engine hostlers who may be required to report for duty late Sunday evening to prepare engines for early departure Monday morning, or to care for locomotives which tie up late Saturday evening. Trains are not sent out of terminals on Saturdays unless there is sufficient traffic under normal conditions for them to reach their destinations before midnight. The entire property is idle on Sunday, the stations being closed and even the crossing watchmen off duty.

No Overtime Is Paid—or Worked

In accordance with Mr. Ford's doctrine that a man properly directed can produce enough in eight hours to support himself adequately, the eight-hour day on the D., T. & I. is an actual one and not merely a basis of pay. No overtime is paid because employees are not permitted to exceed the limit of 208 hours of work in any one month. In cases where employees must do overtime work, the extra time is absorbed in the future by the employees being off. While it might seem at first that the effect of the plan would be to penalize men who perform their work quickly, they are compensated by the fact that the quality and quantity of their service is considered in fixing the rate of their wages. The attitude of the man-

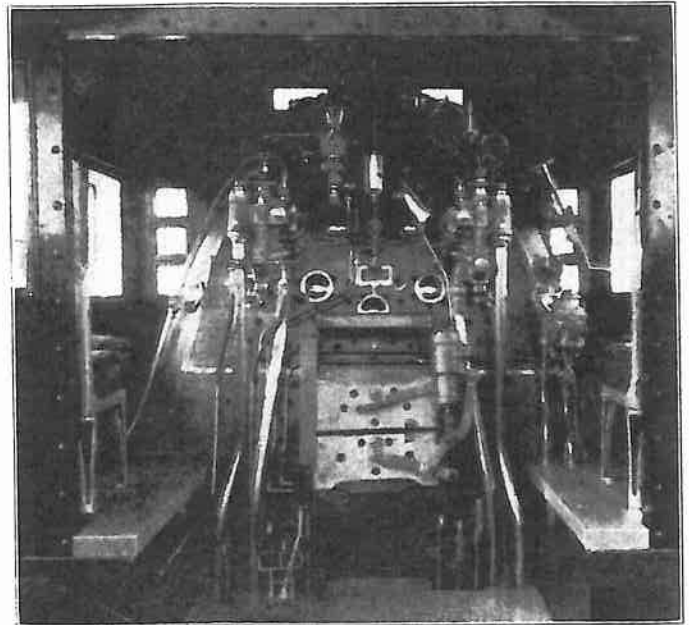
agement is that when punitive overtime is paid, there is no incentive to men to complete their tasks within the regulation eight hours. It has been the experience of the D., T. & I. that the payment of a high wage for a day's work of eight hours speeds up operations in every department.

The payment of such wages, the management concludes, completes all obligations of the employers. Officers and employees of the D., T. & I. are therefore not permitted to accept transportation from other carriers, although transportation over the D., T. & I. is granted to other railroad employees in accordance with the prevailing custom. The few annual passes over the D., T. & I. which are held by its officers are used only on business. No passes are provided for members of employees' families, and if the employees or officers themselves take pleasure trips they must pay their fares.

Neither are old age pensions paid, the attitude of the management being that pensions are merely the deferred payment of wages earned by employees during their years of active service, and that the men should be paid an adequate wage while they are working so that they will be able to take care of themselves when they are no longer able to remain in railroad service.

Deal Directly With the Men

The D., T. & I. does not treat with the brotherhoods, and asks that the employees submit their grievances directly to the management. Special efforts are made to maintain as uniform a force as possible throughout the year although some variations do occur because of traffic



Aluminum Floors, Deep-Cushioned Seats and Nickered Fittings Distinguish Engine Cabs

and climatic conditions. During the months of retrenchment, the work available is divided among the men so that none will be without employment. When traffic volume decreases the number of hours worked per month by each employee in train service is scaled down proportionately. Thus, during the depression last spring the maximum number of hours a man could work was reduced from 208 to 176 hours, for example. This enabled the management to avert laying off some of its men, kept the force intact and assured them sufficient income to at least meet their necessary expenses.

Similarly, no desirable men in the maintenance of way department are laid off during the winter. The D., T.

& I. has found this a convenient opportunity to weed out the undesirable and inefficient men, but the efficient employees are kept at work at least part time. To illustrate, last winter when the section crews were reduced from a standard of six to four men, the work was divided among the six so that each worked four days a week and received an income for this labor, and the gang organization was kept intact every day. Consequently, when spring came, the entire force was available. This practice of keeping efficient men tied up with the company has also been found useful in emergencies where large forces are suddenly in demand.

During summer no extra gangs are employed in maintenance work. Rather the practice is to make each section foreman responsible for all work on his section and when heavy work such as relaying rail or ballasting is necessary, extra men are assigned to his gang, sometimes as many as 20 or 30 at a time. When the need for these extra men on one section has passed they are transferred to another section. Where heavy ballasting or other heavy work must be done, several section crews may be concentrated on one job.

Men Are Kept Busy

The D., T. & I. management believes that in justice to the employees themselves they should be provided with enough work to keep them busy, and it demands the best in them all the time they are on duty. This is done not only to secure a full return for the wages paid, but also to keep the men from falling into poor habits. It is believed that a man in a rut cannot do his best work either for himself or his employer. This practice, of course, reduces the number of employees necessary to the operation of the road and at the same time keeps them in constant action, thus increasing their efficiency and output.

This plan has been carried out without regard to departmental lines and a large number of interesting instances of the operation of the plan are noticeable. For instance, car inspectors at certain points are carried on the section foreman's rolls and are required to work on the track during spare time. At other points car inspectors assist the car repair men. During the recent lull in business a number of cabooses were released from service and set out at these points where they were repaired and repainted in spare time by these car inspectors. Car repair men operate pumps at several stations. Station agents keep their buildings in order and make certain necessary repairs with materials furnished by the stores department. In many instances they paint the station buildings. The traveling auditors are inspectors of all operations on the road and report on the ability of agents and other conditions. Every employee is an inspector of some sort, the trainmen, for example, making monthly reports on safety conditions along the line and at grade-crossings. All employees are also active traffic solicitors, this being obligatory rather than optional as on many roads. There are countless other examples of the ingenuity of the management and employees in providing constructive work for all time employed.

Employees who are disinclined to follow the management in this arrangement are disciplined or discharged. When the D., T. & I. was first taken over by the present owners, there was rebellion against such orders. This trouble is now very largely a matter of the past.

Strict discipline is enforced over the road although as far as practicable this is accomplished by assigning employees to work less pleasant than their regular duties and also less profitable, rather than by taking them out of service. In administering discipline the policy is to refrain as far as possible from discharging a man or

laying him off for any length of time on account of the effect on his family which would thus be deprived of support. It has been found even more effective to assign extra hard work for the man being disciplined while his income will not be discontinued, he will realize that he is being punished. Thus an employee who violates the company's rules may be assigned to manual labor at the cinder pits or elsewhere. Of course, belligerent employees are permitted to sever their connection with the company. Before a man is discharged because he fails to meet requirements of one department he is transferred to other work in an effort to locate where he can make good, if possible.

Neatness and Orderliness the Rule

There is no more hard and fast rule on the D., T. & I. than that the property must be clean and neat and this applies to employees as well. The management believes that cleanliness is an essential to morale. Making cleanliness will not be tolerated any more than making methods.

Buildings are painted in gray inside and out and employees make it part of their duties to keep the buildings clean. Even the insides of desk drawers are painted white so that dirt will not be overlooked. In providing employees with equipment which may be readily kept clean the management has done its share, and therefore has the right to expect the employees, for their own health and self-respect, to be neat and wear clean clothes. Ample locker space is provided in terminal buildings.

The campaign for neatness along the right of way has

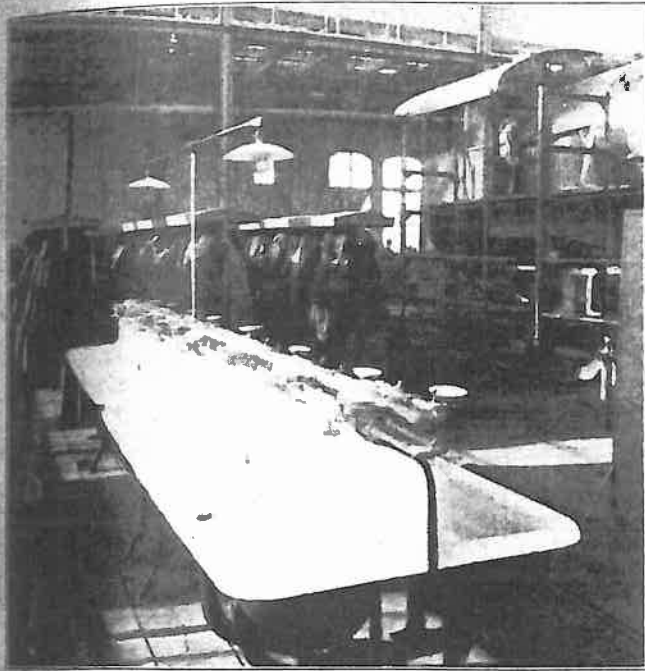


One of the Two Machine Shops at River Rouge, Detroit

been carried to the point that industries located on the D., T. & I. property have been asked to clean up and move back a distance from the right of way. In nearly every instance such action has resulted in the elimination of a side-swipe hazard, and the industries have for the most part been willing to co-operate. The line and property are policed constantly by employees and no refuse is allowed to be dumped on it. Making all employees a real, active part of the clean-up program has given the campaign an added significance to them and has made them prouder of the results. Under expert instruction the employees have been instructed in practical fire-fighting

ing methods. Incidentally, smoking is not permitted anywhere on D., T. & I. property. This rule applies to officers as well as employees, whether on or off duty. Not only is this conducive to better work, but it lessens the hazard of fire.

In the shops neatness and order are also the rule. In the roundhouses the floors and walls of the engine pits are painted in gray while the walls are white and are frequently washed, sometimes daily. The employees' locker rooms and lockers are kept in good order by provision of receptacles for refuse and enforcement of an order to use them. The storerooms with their standard cages and



Modern Washstands and Clothes Hangers Are Provided in Shops

neatly piled stocks are models of cleanliness. The safety department is constantly alert to improve the safety conditions; its work is reflected in the fact that the number of serious accidents is constantly decreasing.

Locomotives on the D., T. & I. are an especial pride. All pipes and fittings are nickel and are kept highly polished. The locomotive cabs are very roomy, made of thick steel, and have large plate glass windows. Among the special features of these engines are the aluminum cab floors, which absorb a certain amount of cold besides making for better appearance; aluminum chairs with thick spring seats; numerous fixed electric lights and extensions, including bulbs under the side running boards to aid enginemen to oil and make night repairs. More than 75 per cent of the D., T. & I. motive power has been thoroughly rehabilitated at the D., T. & I. erecting shops.

When trains on the road are delayed for any reason, all members of the crew, excepting those protecting the train, are required to busy themselves cleaning and polishing the fine work on the locomotive. This is done not only to improve the appearance of the engine, but to remove dirt and thus expose defects and increase efficiency. Fewer repairs are necessary when the locomotives are kept free from dirt and rust. No sledges or other heavy tools are allowed in the standard locomotive tool boxes, as it is deemed that these would do considerable damage in the hands of a careless or unskilled employee. The unusual quality of the D., T. & I. locomotives has given the majority of enginemen a high sense of pride in the

motive power, which, of course, is essential to such a maintenance program.

Before they are allowed to begin their service, newly employed engineers and firemen often spend a week or more in the shops where they do a variety of special work. For example, at the Rouge locomotive erecting shops, newly employed engineers, firemen and certain machinists spend a certain length of time in a department where they buff driving rods and main rods with hand files. This painstaking process teaches these men truly to appreciate just what amount of hard effort enters into a piece of fine mechanical craftsmanship. It impresses upon the men the great value of such mechanical parts, and, furthermore, sharpens their eye in the ready detection of flaws, no matter how small. After this course of training, the men are not nearly as likely to be careless with expensive equipment as they might otherwise have been.

The management believes that this policy of keeping the engines in a prime state of cleanliness has produced a reduction in the number of engine failures. Trains are being hauled with fewer delays and the motive power requires less repairing. A 15 minute delay because of engine trouble constitutes an engine failure on freight trains, as does a 10 minute passenger train delay.

Waste Is Avoided

At every point Mr. Ford and his associates have endeavored to eliminate waste, which they believe constitutes a very large item of railway expense. This has been directed not only at the handling of materials on the D., T. & I., but at the disposition of employees' time, as is evidenced by the efforts made to keep all employees constantly busy at something. The road works on the principle that nothing should be thrown away. Materials which have worn out frequently may be put to good use elsewhere, as in the case of old telegraph poles which were cut into shorter lengths and used as fence posts. Old rail was sent to the Ford coal mines. Discarded cross ties were converted into thousands of bushels of charcoal for use in the forges, and so forth.

Slag from the Ford Motor Company's mills is used as ballast, while a cement mill at the same plant produces sufficient cement for use in bridge construction. Good advertising space on the bridges over highways is not wasted, for there is erected the trademark of the D., T. & I., made into attractive green and white metal signs.

The extent to which the company carries its fight against waste is shown in the case of a D., T. & I. bridge across the Huron river at Flat Rock. When the old pile trestle at this point required renewal, the company constructed one of concrete which serves as a power dam as well, and which is wide enough to accommodate a highway in addition to the railroad tracks.

In 1923, the company began publishing its first employees' paper. The D., T. & I. Railroad News, which appears for free distribution twice monthly. It endeavors to create real good-will and convey to its readers information which they properly should have.

Environment of Men Supervised

The D., T. & I. management regards the higher wages and improved working conditions which prevail on the road as a definite incentive for proper living on the part of the employees. It is believed that to perform his work correctly and satisfactorily, a man must live right. Further, it is believed that there is a possibility of lowering the standard of work by paying increased wages to some employees. On the other hand, it is believed that financial worries harm the quality of work produced by the men. The management feels justified, therefore, in investigating the personal habits and home conditions of employees

when deemed wise. To introduce this helpful advisory policy of seeing that the employees, either through ignorance or wilful neglect, should not endanger themselves or their usefulness, the management upon assuming control, questioned all employees about such matters as the amount of their savings and debts and their personal habits. The policy of keeping tab on the employees' home life for their own welfare as well as for the company's has also resulted in regular inspections of hotels and rooming houses patronized by employees. No cooking or sleeping is permitted in the way cars or cabooses, as it is believed this is not the proper place to secure a good night's rest or a wholesome meal.

Following up the idea that a man who lives beyond his means renders himself less efficient, the management requires its men to conduct their accounts within their incomes under penalty of discharge. In enforcing this rule, 40 employees at one terminal who had bought expensive cars on the installment plan were required to sell them, because the financial obligations were so large that the inevitable result could only have been worry and poor work. D., T. & I. employees, the management thinks, can



A Dirty, Unused Storeroom Was Converted into a Modern First-Aid Station

live on their salaries and will do so and save money if they are shown the folly of extravagance.

To induce its employees to be thrifty, the D., T. & I., slightly more than a year ago, inaugurated a plan by which employees could put a portion of their earnings to work in the company. No rate of interest is guaranteed, but in 1924 the company's financial showing warranted payment of a 14 per cent return to employees holding certificates. These increments cannot be re-deposited and employees may not deposit more than one-third of their regular pay in the savings plan. The employees are not only urged but are expected to purchase the certificates unless there is a sufficient reason for their not doing so. By the beginning of 1925, more than half of the members of the D., T. & I. organization had shown their interest by making deposits, totaling \$278,101.

The D., T. & I. will not allow its employees to be victimized by merchants on account of the fact that these employees may receive higher incomes than their neighbors who are employed by other industries. An example of the manner in which this works is shown in the handling of a problem which arose in Napoleon, O., where a terminal is located. When the higher wages were made effective for D., T. & I. men, merchants established two prices for their goods, the higher one of which applied to D., T. & I. men. This situation was fought by arranging

with a large chain store system to establish a terminal in Napoleon. Prices went back to normal.

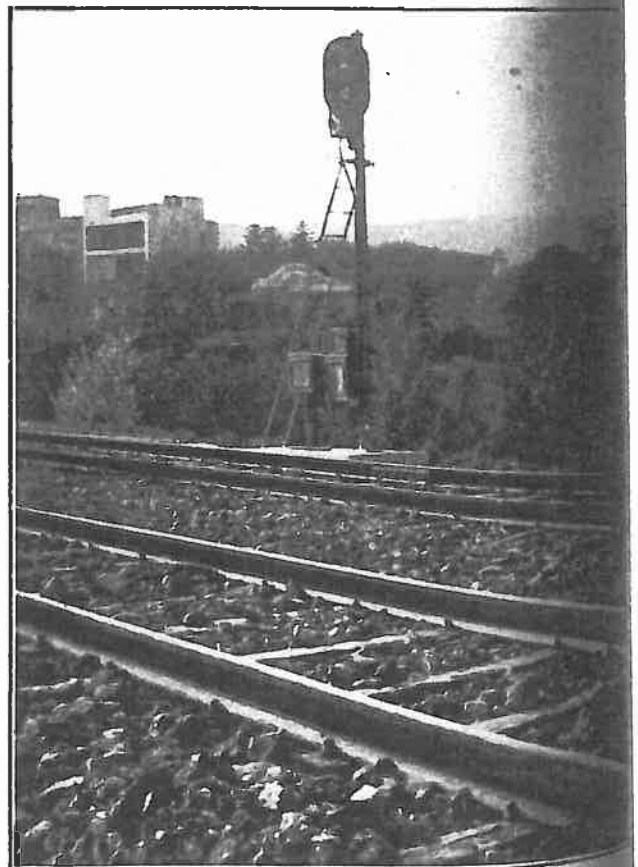
Adequate medical and hospital service for employees is maintained all along the road. Those who are unable to carry on their duties in a home where their children, housekeepers are provided to maintain the family intact until the mother recovers. The aim of this service is to remove from the minds of the employees any apprehension over the result of sickness in the family so that they are able to do their best work at all times.

The Value of the D., T. & I. Experiment

The innovations introduced by Mr. Ford on the D., T. & I. are of value not merely because they have been put the property on a sound basis, but because they should be studied by officers of other roads. Most railway officers will consider that it is impossible to introduce their own roads many of the things that have been inaugurated on the D., T. & I.; however, many of the innovations appear adaptable.

The experience of Mr. Ford and his associates in the operation of the D., T. & I. is most valuable to the transportation industry in general and to railway officers in particular in that it shows the effect of handling the road problem from a new viewpoint. As in other countries, there is a tendency in railroad operation toward despotism of precedent. The success of the different methods advanced by the D., T. & I. indicates that some of the old methods may, perhaps, be changed to the advantage of the patrons, the employees and the railway themselves.

•••••



Color Light Signal on a Spanish Railway