AUTOMATION

Railroads Fit Automation

Railroads have the physical plant and operational control to make them uniquely suited to automatic operation, said John W. Hansen, Manager Sales Promotion and Advertising, Union Switch & Signal Division of Westinghouse Air Brake Co., at last month's Railway Systems and Procedures Association fall meeting. Here is an abstract of his address.

● The technology of railroad automation has made progress in practically every area of operation and administration. It is now technically possible to build a fully automatic railroad, even to the point of actually operating the trains. Extensive application of the fully automatic process to existing rail lines may be regarded as a long range goal, but certainly progress in automation can be economically achieved in many areas with existing systems and devices of proven reliability.

Tests were made on the mainline of the New Haven Railroad in December 1955, when a multiple-unit electrically propelled car with a large number of passengers aboard was controlled remotely as it traveled between Larchmont and Rye, N.Y. There was no one at the controls in the cab during the round trip between these two stations, except when the car was shifted from one track to another at Rye. This car was under control of an operator at Larchmont, who had a small control panel on the station platform. The train was operated at various speeds up to 50 mph. One signal was set at Stop intentionally to demonstrate that the train would be stopped automatically if dangerous conditions existed ahead.

With the Identra automatic train identification system, trains are provided with individual "character" which permits them to register their identity and location—instantly and automatically—as they pass selected identification points, regardless of train speed. This specific identity registration can be used with other available equipment to provide automatic alignment of a route, automatic announcing systems, and in other ways to promote more efficient and more automatic train operation. This equipment is being extensively applied today in rapid transit operation in New York, Philadelphia and Chicago. It probably will also be used to obtain train or car information which can then be fed automatically into mechanized data processing systems.

Presently under consideration by the San Francisco Bay Area Rapid Transit District are plans to erect an automatic passenger transportation system. This installation would employ practically all known automatic systems now in use, in part, on many railroads, into one integrated system of control where movements of trains will be automatically directed and controlled during normal operation, but subject to certain override controls by a train attendant under the direction of a chief dispatcher. In addition to automatic systems now in use, will be a station programming system which will check train position at platforms, open doors for passenger unloading and loading, close doors and start the train—all automatically. Plans for the installation of the first stage of this system will involve a total of at least 600 rapid transit cars. A vital feature of this system would be the use of an automatic block signal system which places the train under direct control of the signal system itself, without the need of wayside signals or an operator to interpret them.

Remote Control Helper Locomotive

Remote control equipment has been developed and is presently being tested on a western railroad, one part of which is installed on the lead locomotive of a train, and the second portion of the equipment is installed on a helper locomotive that may be at any other location in the train. The equipment on the second locomotive is radio controlled from the first locomotive. The remote controls cause much smoother performance than can be obtained by manual operation of the second locomotive because there is much better coordination between the controls of the two locomotives when it is performed automatically.

Here's why the railroads fit our concept of automatic operation so well and why no other transportation system can meet the fundamental requirements so conveniently. The railroads have a series of precisely defined rights of way over which train movements are directed. They are an exclusive lane for train traffic. They are under the direct control of the railroad organization. They follow a geographical pattern where speed limits can be established, switching locations defined and traffic patterns scheduled. Because of these facts, the job of providing complete automation is not only feasible, but entirely practical with today's technology. Because of the exclusive control of private property on which its trains operate, railroads have a tremendous economic advantage over all other forms of transportation when automation is being considered.

Four Steps to Automatic Railroad

Our concept of the development of automatic railroads falls into four major steps. First—continue the extension of remote control from one centralized point. This is commonly referred to as CTC. Remote control allows direction of train movements with a minimum of manpower. Second—would be to add cab signal and train control equipment to provide safety of train operation without the need of wayside signals. Third—decision-making devices for automatically directing train movements would be installed along the wayside. This equipment would remove the routine decision-making operations from the dispatcher. Fourth—would be the addition of the automatic train control servo. This would require the expansion of decision-making devices along the wayside to provide the precise commands that would automatically operate the train.

Automatic operation, as suggested in steps 1, 2 and 3, can be incorporated in a small or large section anytime with immediate returns in greater operating efficiency. Step 4 would be taken when solutions are found to a number of problems existing today. However, the most difficult of these problems are not engineering problems, they are those involving political, social and personnel aspects of automation.

What is the future automation potential of our railroads? Well, in addition to the application of our four steps to automatic operation which I discussed earlier, we believe that an automatic coupler will be developed which will eliminate the pin-puller operation now required in our yards. The hump and trimmer locomotive will be a remotely controlled robot which will require no crew.