

ed for. Compensation for varying power factor is effected by means of a regulator, designed and constructed by the Electric Construction Company, and the first of its kind, which inserts or extracts resistance from the circuit of the shunt field of the excitors by the action of solenoids; these solenoids are respectively excited as the voltage exceeds, or is less than, the normal.

The direct current motor armature and the revolving field alternator are carried on the same shaft without any intermediate bearing. There are only two main bearings on the machines, and these are ball-bearings. These bearings have, so far, given every satisfaction and have proved very advantageous in reducing the starting currents, which at 460 volts is only about 750 amperes, and the no-load loss, which is about 23 kw., with the exciter and alternator fully excited.

The switchboard has been designed and constructed by the railway company, the instruments being of the Westinghouse Company's make. Each of the motor generators is supplied from the low tension busbars through a no-voltage and overload circuit breaker. The shunt circuit is excited through a separate double pole knife switch with kicking contacts and resistances. Starting resistance is cut out by means of a set of knife switches. By means of a throw-over switch these can be used to start either set of the machines, a heavy triple-bladed knife switch being thrown in finally when the machines are fully started up, connecting them direct to the busbars. On the alternating current side each alternator is connected up to the busbars by a hand operated oil switch, and the current passes from the busbar through duplicate automatic circuit breakers to duplicate feeders passing out through overhead lines. All the circuit breakers, both high and low tension, have time limit devices. The exciter shunt fields of the alternators are also connected through double pole switches with non-inductive contacts and resistances. The high tension apparatus is contained in a lockfast expanded metal chamber placed over and at the back of the actual switchboard, the switches being operated from the handles of the latter through rodding. The door of the high tension chamber is interlocked with the holding up coil of the motor circuit breakers, so that unless the door is closed neither motor generator set can be started, while if it is open during running everything stops.

I have to thank the officials of the Midland Railway Company for the illustrations and material contained in this article.

METER RATES IN ERIE, PA.

Twenty (20) cents for each one thousand (1,000) gallons for the first twenty-five thousand (25,000) gallons, and four (4) cents for each one thousand (1,000) gallons consumed thereafter during each current quarter.

Provided: The minimum receipts from each meter (for each quarter) shall be as follows:—

$\frac{3}{4}$ inch or less	\$ 3 75
1 inch	4 50
$1\frac{1}{2}$ inch	6 25
2 inch	10 00
3 inch	18 75
4 inch	38 75
6 inch	100 00

The contract has been let to the Aberthaw Construction Co., Boston, for the new dam to be built for Bellows Falls Canal Co., Bellows Falls, Vt., in accordance with the plans of Chas. T. Main, engineer, Boston. It will be erected directly in front of and bordering the front of the existing crib dam, and will be about 600 feet long, varying in height from 3 to 20 feet. It will be built of solid concrete throughout. A part of the old dam which this is to replace is over one hundred years old. The present trouble and leakage which the new dam is designed to obviate comes largely from this old construction. Work is to be started at once and pushed rapidly.

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THE PUBLIC'S RESPONSIBILITY FOR RAILWAY ACCIDENTS.*

The record of American railroad accidents is appalling. The first step in lessening the number of accidents is a clear understanding of the conditions which are their cause. The Interstate Commerce Commission of the United States tabulated statement of railway accidents contains this list:—

	Killed.	Injured.
Passengers	212	4,398
Employees	2,586	31,983
Others	872	3,147
Trespassers	5,381	5,927
Total	9,051	45,455

The striking feature here is that the majority of the killed were trespassers. For this the railroads should not be held responsible, but is chargeable to the carelessness on the part of the injured. Heedlessness, a desire to beat the law, sheer ignorance—these appear as the causes of by far the larger per cent. of railway accidents. Education and publicity, not legislation, will remedy folly and carelessness.

Railway companies are spending large sums for safety devices—they must continue so to do; but it is not in equipment they will find the solution of accidents due to "perils of the road," but in proper discipline, which discipline cannot be properly maintained without the support of public opinion. Public opinion must be aroused by publicity. Publicity following public and searching investigations. If more attention were given by the newspapers to investigation, reprimand, punishment for carelessness, etc., and less to disasters and loss of life, there would be a more healthy public sentiment supporting railway officials in enforcing regulations.

Mr. J. O. Fagan is quoted as saying: "Nevertheless, in spite of many appearances to the contrary, the problem of the efficient and safe running of trains is a very simple one. Fundamentally, it is not a question of rules or safety devices, but of personal conduct and habits of thought"; and again, referring to fatal accidents, "Now as it seems to me, the all-important facts in these cases do not relate to the nature of the rules, nor even to their non-enforcement, but to the downright neglect of railroad men (employees) to do as they are told."

The efficiency tests have not improved during recent years because the efficiency of the railroad employee has deteriorated. The railways are dependent upon the human element, the responsibility of the employee.

"And how is this realization of responsibility to be brought home to the employee? By the help of the public; by the force of their opinion. It must discriminate between the bad and the good in passing judgment on corporations and their officers. Wholesale disapproval breeds wholesale disloyalty in the industrial army serving them. The unnatural and hostile conditions that have resulted from the attitude of the press and the public toward corporations must be replaced by peace and co-operation; and, while not abating its condemnation of abuses or relaxing its determination to correct them, it must in the exercise of its determination give the support of its all-powerful opinion to the earnest efforts of railroads to improve discipline, increase safety, and generally raise the standard of service."

* Abstract of an article in "Appleton's" for July by Julius Kruttschnitt, Director of Maintenance and Operation of the U.P. and S.P. Railway system.