| | |
|---|---|
| Hardwood piling, 8,075 feet at 13 cents .... | $1,049.75 |
| Steel shoes, 12,690 lbs. at 3 cents ..... | 380.70 |
| Labor ..... | 856.35 |
| Fuel, etc. ..... | 120.00 |
| Total ..... | $2,406.80 |

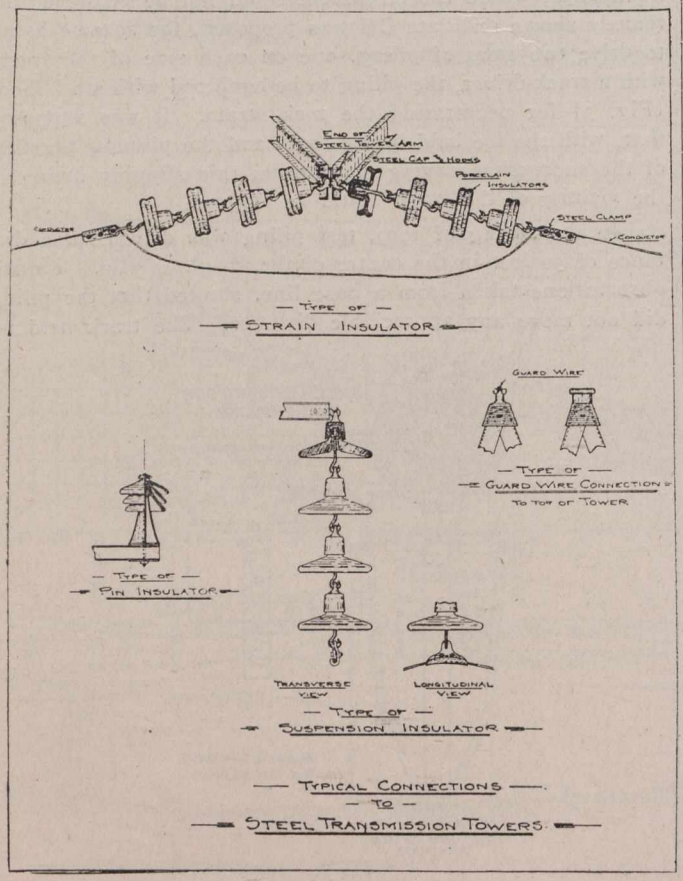
Up to the present time, this remedy has been successful.

At another point, where the rock strata are not at great depth, it is proposed to go down the hillside about 20 feet from the track, put down holes about every 20 feet, and blast the smooth surface of the rock. Thus, by roughening the surface and destroying the stratification, the sliding of the clay may be stopped.

## STEEL TRANSMISSION TOWERS.

**By J. Edw. Jennings, Mem. B.E.C.**

In the last few years a great activity has been manifested in this country in the utilization of water power, its adaption to electricity and the development of long distance electric transmission from remotely situated water power. The hydraulic and electric features are, of course, the main subjects in a project of this kind, but the means of conveying this power for long distances is no small problem.



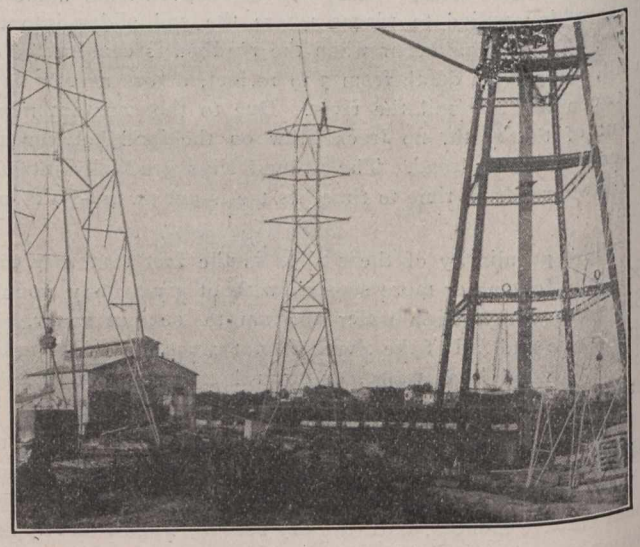

In the writing of this paper discussion of technical details has been particularly avoided and care has been taken not to enlarge on any one subject, at the sacrifice of the whole.

It is intended to cover, in a general descriptive way, the industry of steel transmission towers used to support high tension electric lines. Transmission line engineers have generally adopted the steel tower as the type best suited for supporting transmission lines. The advantages of steel when properly protected with galvanizing are many, and it is intended to point out a few, which, no doubt, will be recognized by engineers and others.

From a practical standpoint a steel tower can be made economically to meet any topographical or climatic conditions. The use of guy wires are avoided; they can be made of sufficient height to allow for long spans between the towers, consequently for a given mileage of line there are fewer obstructions at the ground and fewer insulator connections. The durability of galvanized steel towers is practically permanent.

Probably the most essential requirement for high tension lines is the one of reliability. Lines carrying a voltage of from 50,000 to 110,000 volts are likely to create considerable damage, if by any cause a tower should fail. Large interests, whole towns, are depending absolutely on the reliability and continuity of the current for their light, heat and power. From the foregoing it was pointed out that high towers mean fewer towers, thus bringing the chances of failure, as far as number of towers is concerned, down to a minimum. The strength of steel runs more uniform than a natural material such as wood.

The first cost of steel will probably run more than wood, but after a few years' operation, with difference in cost of maintenance, depreciation, renewal of line, etc., the first cost will soon be far exceeded and the steel construction prove cheaper than wood.



**Testing Towers.**

### Types.

The towers here described will be unguyed or self-supporting and are divided into four general types, namely, intermediate, terminal, angle and transposition. There are various attachments, extensions, etc., required for special conditions, but the four different types with their names suggesting the respective requirements, cover the equipment of the ordinary tower line.

An intermediate tower is the standard tower of the line. From a strict standpoint of strength, the ideal condition would be to have each individual tower of sufficient strength to safely resist the longitudinal pull of all wires, but from an economical and a practical standpoint this is not at all necessary. If there were no such thing as wires breaking, an intermediate tower would need be strong enough only to resist side wind pressure and vertical loads. Unfortunately the breaking of cables is a condition that must be met and provision made in the tower to properly resist its effect.

* Read before the Brooklyn Engineers' Club.