

- L
- (1) Where the value of $\frac{L}{r}$ is 3.
- L
- (2) Where the value of $\frac{L}{r}$ is 12

By using, say, the Fidler formula for live loads we obtain the following:

	Permissible stress, square inch.	Area.	Total load allowable.
(1).....	13000	4	52000
(2).....	5500	4	22000

Now, in computing loads, a great deal of guesswork has to be done for general designing, more particularly so far as wind and snow loads are concerned, and although our information on these points is getting more complete we are still likely to make mistakes, as is evidenced by the failures that take place from time to time.

Therefore, assuming that in this particular case we arrive at the correct loading by about 10,000 lbs, this would amount to, say, 20 per cent. increase in the first case, which is not very serious, and 50 per cent. increase in the second.

It will be seen, therefore, that if we calculated on the Carnegie formula for live loads factor of safety five, we should require 3.4 square inches @ 6,400 lbs. to carry the 22,000 lbs. load in the second case but with the increase of the load to 32,000 lbs. our stress on the 3.4 square sectional area would jump to 9,400 lbs. per sq. inch, whereas, with Fidler's formula the actual stress would be 8,000 lbs. square inch.

It is evident that a small increment of loading on a column with a large value of $\frac{L}{r}$ is likely to prove dangerous,

L

but with small values of $\frac{L}{r}$ the percentage increase being considerably lower, this is not so serious, and, therefore, the most rational factor of safety is the sliding one of a similar type to that given above.

The curves given on the diagram No. 1 may all be quite safe if applied in the particular way intended, but are they all sound commercially? That is, can they be used in a competitive sense, and further, is the indiscriminate use of these formulæ to be recommended?

The writer is of the opinion that it would be an immense gain to the manufacturers in this country if a standard series of curves could be arrived at, and there does not seem to be any reason why one set of figures should not meet the case.

Starting, say, with columns for dead loads, fixed ends, it would be a simple matter to fix a reduction of so much per cent. for live loads and a further reduction per cent. for impulsive loads. The same could be done for pin ends, and the whole thing would then lend itself very well to the compiling of standard tables, which would count for efficiency and a great saving in labor in the designing office.

A LONG TUNNEL.

The Nepton tunnel, now being driven in the Pachuca, Mexico, district, will be over six miles long when completed. It lies at a depth of about 1,400 feet below the city of Pueblo. It was started 18 years ago, but only about two miles has been completed. It will drain the Pachuca mining district and afford an outlet for the different mines.

TELEPHONE COMPANIES OF CANADA.

Canadian Telephone statistics compiled to the end of June, 1911, have been completed by the Department of Railways and Canals, and issued in the form of a report. This is the first attempt of the Department to prepare statistics relative to the telephone in Canada, and it is to be regretted that more managers did not comply with the request of the Department in furnishing material for a more comprehensive and larger report. In all 537 companies forwarded a complete or semi-complete statement, and of these the province of Ontario was shown to have the bulk of Canadian telephone business by a great lead. The report, when divided into provinces, resulted as follows:

Ontario	319
Quebec	32
New Brunswick	16
Nova Scotia	14
Alberta	4
Saskatchewan	143
Manitoba	3
British Columbia	5
Prince Edward Island	1

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In the provinces of Manitoba, Alberta and Saskatchewan the Provincial Government has, in a certain measure, taken over the management of the telephone companies in their respective provinces. This is particularly the case in the two former provinces; as all the separate organizations which previously existed have been merged under the control of the government. In Saskatchewan the process of government absorption has taken definite form, but at the close of the month of June last there were still 142 companies holding their independence.

Of these 537 companies a great number are classed as rural, and these have, as a rule, an equipment of the lowest possible monetary value, and represent the so-called "party lines."

The combined capital of these 537 companies amounted to \$40,043,982.29; of this total the province of Quebec had a combined capital of almost \$19,000,000. This is the largest amount of money invested in telephones of any province of Canada, and may be accounted for by the fact of the heavy capitalization of the Bell Telephone Company in Montreal.

The gross earnings reported totaled \$10,068,220, and of this sum \$6,979,045 was operating expense; being a percentage of operating expense to income of 69.32 per cent.

At the close of June, 1911, the combined length of telephone wire of the various Canadian companies was represented by 687,728½ miles of wire, and to this length 302,759 instruments were connected. The mileage of wire was divided into 576,712¾ miles for urban use, and 111,015¾ miles for rural purposes.

The energy required to operate these instruments is derived from two sources, viz., central energy and magneto. Of these 174,994 were operated by the latter means and 127,765 by the former.

A FLOODED SUBWAY.

The Wellington Street subway of the Grand Trunk Railway in Montreal was so badly flooded by the thaw recently that street cars were held up, and passengers were put to much inconvenience. As soon as the drains were opened up the regular service was resumed.