

TECHNICAL REGULATIONS CHANGE NECESSITY IN THE FIELD OF BUILDING OVERHEAD LANDLINES VOLTAGE RATIO 0.4 kV TO 35 kV

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SUMMARY

This paper deals with the problem of inequality and incompatibility of the following regulations and laws:

"Technical normative regulation about overhead landlines 1kV to 400 kV building", Gazette of SFRJ 65/88 and 18/92,

"Technical normative regulation about overhead low voltage grid building», Gazette of SFRJ 6/92, and "Road low", Gazette of RS 46/91, 52/91, 53/93, 67/93, 48/94.

Two subjects have been treated. Both of them are everyday problems in electric utility activity.

The first item is precise definition of conditions for low voltage grid crosses the overhead landlines voltage ratio 1kV to 35 kV. A proposal for change of both above-mentioned regulations is given as a solution.

The second topic is overhead lines 0.4 kV to 35 kV an approach to roads of all categories, except highways. This topic is more complicated, because in order to solve it, we have to change "Technical normative regulation about overhead landlines 1kV to 400 kV building" and "Road low".

Presently, in both regulations, especially in "Road low" safety distance between electrical pole and road is too long. Right-a-way is almost impossible to fulfill properly.

FOREWORD

The intersection of low voltage grid and the overhead bare landlines has made problem to designers of electrical networks, because it was not defined precisely in "Technical normative regulation about overhead landlines 1kV to 400 kV building" and "Technical normative regulation about overhead low voltage grid building". There are many solutions for this situation at the cross-country. If overhead bare landline fell down on low voltage grid, it would cause an accident, which may originate human victims and large material damage. The first part of the paper deals with precisely defined low voltage grid crosses the overhead bare landlines in regulations and equalize both regulations.

Safety distances between overhead landlines' poles and roads of all categories, except highways, which were defined in "Technical normative regulation about overhead landlines 1kV to 400 kV

building” and “Road low” have made multiplex problem in electric utility activity. Safety distances are too long. Building permission depends on respect of safety distances in project. Right-a-way is another problem, because almost neither property owner wants to give permit for setup of electrical pole so deep in his land. Setup of poles is a problem too; hard mechanization goes deep in property owner’s possession. Equipment maintenance is difficult, especially on pole-mounted substation. Author suggests to adopt a new safety distances between electrical landlines’ poles and roads all categories, except highways.

THE INTERSECTION OF LOW VOLTAGE GRID AND THE OVERHEAD BARE LANDLINES VOLTAGE RATIO 1 – 35 kV

The intersection of low voltage grid and the overhead bare landlines voltage ratio 1-35 kV is defined in “Technical normative regulation about overhead landlines 1kV to 400 kV building”, according to the article 155 to 160. Uppermost voltage ratio limit for low voltage grid crosses the overhead bare landlines voltage ratio 1-35 kV is not given.

“Technical normative regulation about overhead low voltage grid building” treats the problem, in article 35.

Am did were not quoted here, due to prolix paper. Conception for the creation of new articles conception is given in the following items.

- The first item, that we should change in “Technical normative regulation about overhead landlines 1kV to 400 kV building”, is separation voltage ratio in two groups, 1 – 35 kV and 110-400 kV.
- In “Technical normative regulation about overhead low voltage grid building”, article 35, quotes “Low voltage grid crosses the overhead bare landlines voltage ratio above 45 kV is not allowed.”² That sentence must stand in “Technical normative regulation about overhead landlines 1kV to 400 kV building” too.
- Low voltage grid crosses the overhead bare landlines voltage ratio 1-35 kV should be defined as follows:
Low voltage grid crosses the overhead bare landlines voltage ratio 1-35 kV is allowed on the same pole. Overhead bare landline is on mechanically reinforced insulators. Low voltage grid is obligatory under overhead landline, with minimal safety height of 2.5 m.
Low voltage grid crosses the overhead bare landlines voltage ratio 1-35 kV in span is allowed too. Overhead bare landline is on mechanical and electrical reinforced insulators. Low voltage grid is obligatory under overhead landline. Low voltage grid is made of aerial bundle cable. Two bare conductors to ground, with breaking solidity 1000 daN, above low voltage grid are obligatory. Minimal safety height between overhead landline and ground conductors in the worst condition is minimal 2.5m.
Other low voltage grid crosses the overhead bare landlines voltage ratio 1-35 kV cases are not allowed.
- Low voltage grid can be mounted with overhead bare landlines voltage ratio 1-35 kV on the same poles. Overhead landline is above low voltage grid. Overhead landline is on mechanically reinforces insulators. Minimal safety height is 2.5 m at the pole and 2.0 m in the middle of the span.

SAFETY DISTANCES BETWEEN OVERHEAD LANDLINE VOLTAGE RATIO 1-35 kV AND ROADS OF ALL CATEGORIES EXCEPT HIGHWAYS

Safety distances between overhead landline voltage ratio 1-35 kV and roads of all categories, except highways are a very complex problem. “Technical normative regulation about overhead landlines 1kV to 400 kV building”, articles 118 to 123 and “Road low” article 36, demand long distances between landline’s poles and roads.

There are two different terms in am regulations. The distance between the pole and road’s outside rim and distance between pole and road’s earth zone outside rim, respectively. Another problem is “Technical normative regulation about overhead landlines 1 to 400 kV building” and “Road low” have defined different safety distances for same situation.

The author suggests new safety distances between overhead landline voltage ratio 1-35 kV and roads of all categories, except highways. Terms and safety distances must be equal in both regulations.

- Voltage ratio separation. The first group, overhead landline 1-35 kV and the second group 110-400 kV. “Technical normative regulation about overhead landlines 1kV to 400 kV building” has

defined safety distance between overhead landline and the pole, for voltage ratio 220 kV on of basis safety distance for voltage ratio 10 kV plus 0.75m. It is a complete nonsense.

- Road's earth zone is not a term to be used in the future, since the road's earth zone is not precisely defined. It is different on different roads and somewhere does not exist. We should define safety distances as the distance between overhead landline pole and road's outside rim, in all regulations.

For an asphalt road, it is rim of asphalt. For non-asphalt road, it is roadway's rim. Figure 1 presents idealized road's cross section with road's earth zone and electrical pole. L_r is the distance between road's outside rim and pole. L_e is the distance between road's earth zone rim and pole.



Figure 1
Idealized road's cross section

- If there is a plan for road expansion, then it is the first priority.
- Suggested safety distances are shown in table 1.

Table 1
Suggested safety distances between overhead landlines' poles and roads all categories, except highways

	Pole mounted substation 10(20)/0,4 kV/kV	Overhead landline's pole 10(20) kV	Overhead landline's pole 35 kV
Village road	3 m	2 m	4 m
Local road	4 m	3 m	5 m
Industrial road	4 m	3 m	5 m
Regional road	5 m	4 m	7 m
Main road	7 m	6 m	10 m

- Term "village road" does not exist in regulations now. It is included, due to permanent necessity of determinant distance between pole and village road.
- Table 1 does not treat particularly the situation of overhead landline crosses the road. Safety distances are given in all situations.
- Articles about new safety distances should stand equal in "Technical normative regulation about overhead landlines 1kV to 400 kV building" and "Road law".

CONCLUSION

Low voltage grid crosses the overhead bare landlines voltage ratio 1-35kV, should be precisely defined in "Technical normative regulation about overhead landlines 1kV to 400 kV building" and "Technical normative regulation about overhead low voltage grid building". The same new text in both regulations is very important.

Safety distances between overhead landlines' poles and roads of all categories, should be reviewed. Author invites all specialists in this filed to give their opinions about both topics. The aim is the improvement of the regulations, in order to increase efficiency of the whole team of employees in electric utilities.

LITERATURE

1. "Technical normative regulation about overhead landlines 1kV to 400 kV building", Gazette of SFRJ 65/88 and 18/92,
2. "Technical normative regulation about overhead low voltage grid building", Gazette of SFRJ 6/92,
3. "Road law", Gazette of RS 46/91, 52/91, 53/93, 67/93, 48/94.