

SEE QI project 3: Standardization of overhead electrical lines: National Normative Aspects (NNA) to EN 50341-1

Regional Consultancy Fund for Quality Infrastructure (QI) in South East Europe (SEE)

Main result: Standardization institutes and technical experts develop specifications for a regionally harmonized draft NNA document for overhead electrical lines.

Duration: September 2019 – October 2021



Coordination:

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Background

The CENELEC standard EN 50341-1 for design and construction of overhead lines above 1 kV AC from December 2012 obliges member countries of CENELEC to prepare National Normative Aspects (NNA) reflecting national characteristics. In general, these national normative aspects include specifications referring to special national conditions (i.e., weather conditions), legal deviations and national complements.

The regional approach

Bosnia and Herzegovina, Montenegro and Serbia are small countries in the same geographical area, with similar climatological conditions and historically grown with the same regulations in this field. Therefore, a joint approach of the 3 countries for specific aspects to be defined in NNAs is an ideal use of synergies and an effective approach to share knowledge. The formation of a regional working group in late 2018 addressed this issue in a harmonized approach for the closely connected economies created synergies by mutually learning from each other.

The regional NNA working group asked the SEE QI Fund for support via international technical expertise in mid-2019. PTB identified two experienced experts from Austria and Slovenia, who recently have been involved in the development process of an NNA to EN 50341-1 in their respective country.



In December 2019 a regional kick-off workshop was held in Belgrade, where approx. 40 experts from BiH, Serbia and Montenegro agreed upon a joint action plan and defined the project contributions. Observers from Albania and North Macedonia, the mentioned experts from Austria and Slovenia as well as an expert in meteorology from Germany also attended the workshop.

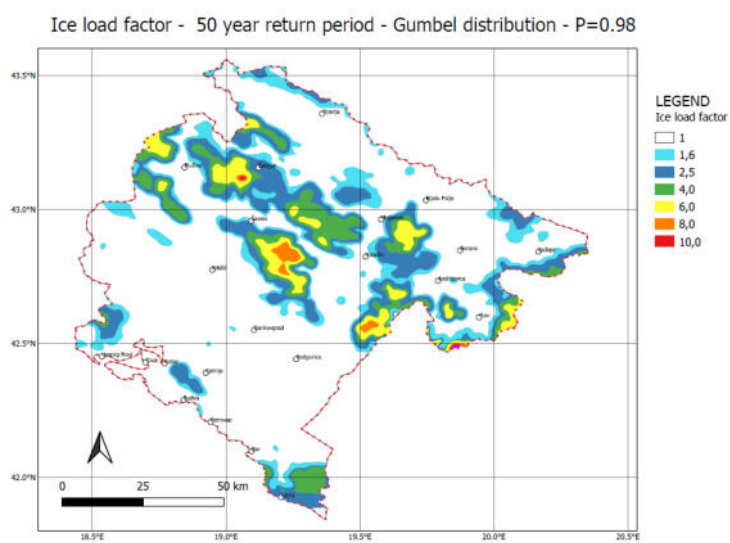
Presenting results of the kick-off workshop, Belgrade, 12/2019

Between late 2018 and late 2021, the regional working group and its 8 sub-groups held numerous meetings, since the COVID-19 pandemic exclusively virtual ones. One meeting in presence and four regional virtual meetings were attended by the international experts, in order to provide consultancy and guidance and report from the approach and progress of the NNA development in their respective countries.

The new philosophy in the construction of overhead electrical lines

The main challenges / innovations required by the use of EN50341 and the NNA compared to the previous and still valid technical regulation from the Yugoslav era are the following:

- The change from the deterministic design practice (based on a long tradition of empirical design methods) to the new probabilistic design (based on probabilities, return periods and reliability levels)
- The change to Eurocodes, which are nowadays state of the art for the dimensioning of structures
- The introduction of a structural design method in EN50341 which is based on the limit state concept used in conjunction with the partial factor method
- The non-availability of sufficient climatic data in broad areas of the concerned countries
- The coordination of the new approach between all parts of an overhead line, from earthing grid, foundation, structure, conductors, insulators, fittings and ground wires as well as electrical clearances to ground and any kind of objects in the vicinity of a line.



One of the challenges consisted in the development of hydrometeorological maps for wind and ice load, since ice load measurements are not available sufficiently for the application of the new approach. The PTB project financially supported the modelling of those maps for BiH and Montenegro from open-source data by an expert, who has developed the respective maps for Serbia.

Draft of a hydrometeorological map for Montenegro

During the 3 years of regional consultations, the document was gradually updated and improved in its quality. The present version of the draft NNA consists of 173 pages. Comparative calculations based on the old and new standard (with NNAs) need to be carried out as one of the next steps, to ensure a practicable use of the new design method.

After finalisation of the draft, the document will enter the stage of a public consultation process in the concerned countries. After this the NNA will be forwarded to CENELEC for approval as official CENELEC NNA to EN 50341-1 of the respective countries.

All CENELEC countries have to establish their NNAs to complement the “main body” of EN50341. The group benefited from the experience from the establishment of NNAs in Austria, Germany and Slovenia. This helped much to reduce time, efforts and expenses for the establishment of the said NNAs. The observers from Albania and North Macedonia have not yet set up national working groups for the development of their respective NNA. Once this will happen, they will benefit from the regional draft document and the experience that the regional working group has shared with them.

The support to the regional working group by the PTB project ended with a hybrid-meeting that was held on 25.-26.10.2021 in Belgrade and attended by members from the 3 countries and the international advisor from Austria.