

The calculation of equidistant cable-nets

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ABSTRACT

The calculation of equidistant cable nets is a purely geometric task. It is mastered here by developing the equidistant mesh on a base surface along two guidelines and cutting it with the boundary edge. Because the equidistant net must produce an equilibrium figure under pretension, the surfaces on which the net is generated are by no means arbitrary.

The basic surfaces should therefore be created in a form-finding process that takes the properties of the cable net into account as far in advance as possible. If one knows the mesh size of the cable net, the angle between the cable lines (e.g. 90° or 60°) and the pre-tensioning of the net, these parameters must be taken into account in the form-finding process. In this way, surfaces are created that already correspond as closely as possible to the cable net to be determined later. For a better understanding, it should be noted here that no equidistant meshes are created in pure form-finding processes!

After the form-finding process, the equidistant cable net can be created on the "form-finding surface" with the help of 2 guidelines and geometric calculations.

With the creation of the equidistant cable net, however, the task is not yet completed because the cable net created in this way is not an equilibrium figure. Therefore, the cable net must now be examined with static calculations under all load cases. Only when the structural analysis has yielded a satisfactory result does one proceed with the creation of the production drawings. The overall process can therefore be represented as follows:

1. Form-finding process with the properties of the cable net. An equilibrium figure under pretension with unequal mesh lengths is obtained.
2. Generation of two guidelines on the form-finding surface.
3. Geometric calculation of the equidistant cable net on the form-finding surface.
4. Evaluation of the cable net with static calculations under all load cases.
5. Creation of the production plans.

Examples are used to demonstrate this method and its high efficiency.

REFERENCES

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