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## **DESIGNING ROOF GEOMETRY WITH TOPOGRAPHIC SURVEY METHOD**

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In the literature, designing the roof geometry in the case of polyhedral solids is dominated today by a method based on determining the nodal points of the roof slope through the use of bisectors of angles created for the pairs of lines of the eaves. The author is not familiar with the name of this commonly used method, but in order to improve the description which can be found later in this summary, it will be called the bisectors method. This method has its limitations in use. The most important of them is that the method can only be used for the roofs with the slopes which are inclined at the same angle to the reference plane, usually equated with the horizontal plane. The second limitation of the bisectors methods is the need to treat the process of construction as hypothetical until the entire roof is designed (which is when the hypothetical solution becomes real), or until it turns out that, unfortunately, it is not possible to design the roof according to the adopted constructing order and you have to look for another "starting point" of the structure. Another limitation that you may stumble upon while designing the roof with the bisectors method is the appearance of horizontal roof valleys in the completed roof design. The presence of horizontal roof valleys is considered as an error and requires a redesign of the roof geometry.

According to the author, the response to those imperfections of the diagonal method is a topographic survey method the basic assumption of which can be found in *Nauka o rzutach* written by Stanisław Szerszeń and which is also mentioned by Edwin Koźniewski.

The basic premise of this method is obtaining consecutive points belonging to the edge of the roof, not necessarily nodal points, by creating horizontal sections through the roof under design. This method allows you to include the roof slope at different angles to the horizontal plane. It also allows you to implement the solution through successive narrowing of the roof polygon in a horizontal projection where the part which is designed in the first step will not change until the end of the solution and can be considered as a part of the final solution. In this method, horizontal roof valleys do not occur. Thus, the topographic survey method does not include the flaws of the bisectors

method. Additionally, an algorithm which, according to the author, could become a part of the CAD software, is easy to write on the grounds of the principles of this method.

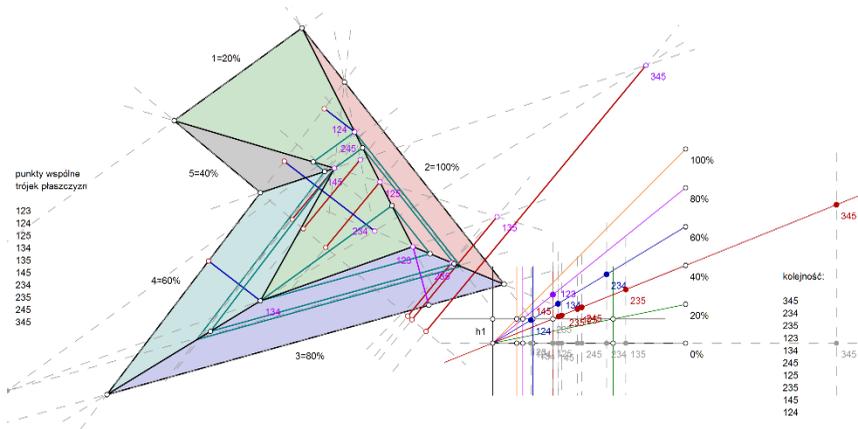


Fig. 1 Roof designed with the topographic survey method.

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