

**ASSESSMENT CRITERIA
CONSTRUCTION SURVEYING II – ETG5112**

LEARNING OUTCOME	ASSESSMENT METHOD	ASSESSMENT CRITERIA
<p>1.. Describes and practises surveying during construction of single-storey industrial buildings and storehouses and designs accuracy of their surveys</p>	<p>Oral examination</p>	<p>Marking “1” (“sufficient”) <i>Insignificant by completing of basic criteria are presented</i> “2” (“satisfactory”) <i>Threshold criteria</i> Knows the main construction elements of single-storied industrial building and storehouses; Knows the surveying technological scheme in construction of single-story industrial building and storehouse and gives examples about construction tolerances by SNiP; Describes plumbing columns with uniform or variable cross-section by means of the theodolite; Knows principle one (of the two) methods of alignment by means of the cross-levelling and the following detailed setting out the axes on the columns by means of the measurement tape; Able to perform as-built surveying of the lower section of the columns by means of the total station; Able to perform as-built surveying of the columns vertical position by means of projection method and the methods of as-built surveying the heights of column; “3” (“good”) <i>In addition to threshold criteria</i> Knows the main tasks of the surveying in skeleton construction; Can use the nomogram of the RT 02-10102 ; Knows the marking principles of the column’s geometrical axes; Knows the other method of alignment by means of the cross-levelling; Knows, how to link the second order control points in the building with the first order control points out of the building; Knows as-built surveying of the columns vertical position by method of the parallactical angles; <i>Significant shortages by completing of</i></p>

		<p><i>next level criteria are present</i> “4” (“very good”) <i>In addition to the previous criteria</i> Knows geometrical conditions of the skeleton construction endurance; Knows principal differences between Finnish rules RT and RakMK; Knows which checks of the theodolite have to be executed before plumbing the columns; Knows, how to check of the correctness of the measurement the columns’ dimensions; Can compute the deviations of the columns by means of the coordinates; Knows the as-built surveying of the columns’ heights by means of DR total station; <i>Significant shortages by completing of next level criteria are present</i> “5” (“excellent”) <i>In addition to the previous criteria</i> Knows the influences, which can change the geometrical parameters of construction; Compares the accuracy, required by RT, RakMK, SNiP by means of an example to be given; Knows sources of the errors by plumbing the columns; Knows sources of the errors of alignment by means of the cross levelling and the taping Can compute (<i>a priori</i>) errors of point coordinates, measured or set out by means of the total station;</p>
<p>2. Describes and practises surveying during construction of bridge-crane runway (top-riding and under-running cranes) and designs its accuracy</p>	<p>Oral examination</p>	<p>Marking “1” (“sufficient”) <i>Insignificant shortages by completing of basic criteria are presented</i> “2” (“satisfactory”) <i>Threshold criteria</i> Knows a method of the setting-out and levelling the under bridge -crane beams; Knows as-built surveying deviations of the bridge-crane rail by means of the cross levelling (theodolite on the crane beam); Knows the ordinary principles of the levelling of the bridge-crane rail;</p>

		<p>Knows a method of the beam-crane-runway setting out; Knows the method of as-built surveying of beam-crane-runway by means of the precision zenith lot, total station, level and a hand-held laser-distancemeter; “3” (“good”) <i>In addition to threshold criteria</i> Knows principles of installation of the forced centring bracket for theodolite or/and the laser level on the level of the crane-runway; Knows one more method for setting out of the bridge-crane-rail; Knows the as-built surveying of the bridge-crane rail, using alignment by means of the cross-levelling (theodolite on the floor of the bay); Knows one more method of the beam-crane-runway setting out; <i>Significant shortages by completing of next level criteria are present</i> “4” (“very good”) <i>In addition to the previous criteria</i> Knows the accuracy standards for instruments in surveying of the crane-runway and the tolerances of the crane-runway mounting; Knows technology of the bridge-crane-runway levelling from the three stations; Knows principles of as-built surveying of the beam-crane runway by means of the DR total station. <i>Significant shortages by completing of next level criteria are present</i> “5” (“excellent”) <i>In addition to the previous criteria</i> Knows the principles of the crane-runway-axes optimization computation; Knows the principles of the crane-runway rail as-built surveying by means of the total station; Knows the possibilities of the beam crane runway as-built surveying by means of the 3D High-Definition Scanning.</p>
<p>3. Describes surveying during construction of multi-storey prefabricated</p>	<p>Oral examination</p>	<p>Marking “1” (“sufficient”) <i>Insignificant shortages by completing of basic criteria are presented</i></p>

<p>skeleton buildings and designs its accuracy</p>		<p>“2” (“satisfactory”) <i>Threshold criteria</i> Knows the general concepts about the multi-storey prefabricated skeleton building erection geodetic service and the principles of the columns’ directional mounting; Knows and explains the technology of the projecting the longitudinal axis on the construction floor, using the alignment by means of the cross-levelling; Knows and explains the technology of the projecting the secondary control points on the construction floor by means of the polar tie-in method; Knows and explains of the construction storey as-built surveying using the alignment by means of the cross-levelling and taping; Knows a method of the construction storey levelling;</p> <p>“3” (“good”) <i>In addition to threshold criteria</i> Knows the technological system of the surveying in construction of the multi-storey skeleton building; Knows and explains the technology of the projecting the cross-axis on the construction floor, using the alignment by means of the cross-levelling; Knows the differences of projecting the secondary control points on the construction floor by means of the polar tie-in method, bipolar tie-in method, laterangulation method; Knows as-built surveying of the columns with the quadrangle shaped cross-section by means of the total station; <i>Significant shortages by completing of next level criteria are present</i></p> <p>“4” (“very good”) <i>In addition to the previous criteria</i> Knows the SNiP tolerances about erection of the multi-storey skeleton buildings; Knows the technology of the projecting the secondary control points on the construction floor by means of the vertical sighting;</p>
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<p>4. Describes surveying during construction multi-storey, cast-in-situ, brickwork and large panel buildings and designs its accuracy.</p>	<p>Oral examination</p>	<p>Marking</p> <p>“1” (“sufficient”)</p> <p><i>Insignificant shortages by completing of basic criteria are presented</i></p> <p>“2” (“satisfactory”)</p> <p><i>Threshold criteria</i></p> <p>Knows technological scheme of the surveying in construction of the cast-in-situ buildings;</p> <p>Can set-out the position of the formwork of the columns with quadrangle cross-section;</p> <p>Can measure the deviations and inclinations of the wall;</p> <p>Knows technological system of the surveying in construction of the brickwork buildings;</p> <p>Can execute the levelling of the storey;</p> <p>Knows the main construction details of the large panel building, the list of the types of surveying, the principles of the large-panel details’ setting-out and the as-built surveying of the construction storey.</p> <p>“3” (“good”)</p> <p><i>In addition to threshold criteria</i></p>

		<p>Knows the principles of the setting and plumbing the columns with circular and quadrangle cross section; Knows the setting-out of the window apertures of the brickwork buildings; Knows projecting the principal axis on the construction floor of the large-panel building by means of the straight sighting.</p> <p><i>Significant shortages by completing of next level criteria are present</i> “4” (“very good”) <i>In addition to the previous criteria</i> Knows two methods of the tying the secondary benchmark on the construction floor with the primary benchmark of the building-site ; Can derive the equation of the error of the trigonometric levelling; Can execute a measurement of the inclination of the brickworks buildings’ bearing walls; Can determine the required accuracy of surveying in construction of the large-panel buildings;</p> <p><i>Significant shortages by completing of next level criteria are present</i> “5” (“excellent”) <i>In addition to the previous criteria</i> Can compute the coordinates of the points on the curvilinear axes of the cast-in-situ buildings; Can determine, proceeded from the construction tolerances, the required accuracy of the surveying in construction of the brickwork buildings Knows technology of the surveying in the construction of the lift shaft.</p>
<p>5. Describes features of surveying during the construction of the high-rise buildings</p>	<p>Oral examination</p>	<p>Marking “1” (“sufficient”) <i>Insignificant shortages by completing of basic criteria are presented</i> “2” (“satisfactory”) <i>Threshold criteria</i> Knows the tower type structures. Knows the meteorological influences on the towers and the reasons why they are not predictable; Calls out 4 methods for projecting the centre of the tower on the construction</p>

		<p>level; Knows the detailed surveying in the tower type structures; “3” (“good”) <i>In addition to threshold criteria</i> Knows the error's components of the forming the vertical by means of the precision zenith lot; Can compare the tower centre projecting by means of the step-by-step method and the once-through method; <i>Significant by completing of next level criteria are present</i> “4” (“very good”) <i>In addition to the previous criteria</i> Knows the centre projecting method in which the corrections on the construction level are computed by means of the corrections of the previous level, measured synchronous; <i>Significant shortages by completing of next level criteria are present</i> “5” (“excellent”) <i>In addition to the previous criteria</i> Knows the influence of the temperature in the surveying in construction.</p>
	Preconditions of the assessment	<p>Assessment of the thereby presented four homework. Submitting the correct report of the 7 laboratory work (group work) in time</p>
	Development of the mark	<p>The examination establishes the overall mark</p>