



CoConstruct

Digital learning meets sustainability

Elements of Capacity Building with Indicators and Good Practices



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Berufsgymnasium für Bauwesen, Architektur
und Geodäsie "Angel Popov" (PGSAG)
Jokilaaksojen koulutuskuntayhtymä / The
Federation of Education in Jokilaakso, JEDU
Politechnika Poznańska (PUT)
Zespół Szkół Budownictwa Nr 1 (ZSB1)
SC MANCOM CENTRU S.R.L

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1. Elements of Capacity Building with Indicators

In our project partnership of [CoConstruct](#), we focused on construction and building professions, along with digitisation, while also considering environmental and sustainability aspects. The partners brought together good practices and new approaches to shaping vocational education with a focus on digitisation and technological innovations from four EU countries, evaluating their usability for EU-wide transfer and institutional integration.

Capacity building involves enhancing the capabilities, resources, and effectiveness of organizations. It may include training staff, improving processes, adopting advanced technologies, and strengthening governance structures to achieve higher levels of efficiency, productivity, and impact.

Elements of capacity building with indicators on the example of the CoConstruct project partner Institutions:

BULGARIA Professional School of Civil Engineering, Architecture and Geodesy "Angel Popov"

POLAND Technical Vocational School for Construction (ZSB1)

FINLAND JEDU Vocational Educational Centre

GERMANY Berufsförderungswerk der Bauindustrie Berlin-Brandenburg e.V., BFW-BB

Category	Indicators	Status quo	Strengths	Weaknesses	Needs
1. School structure and resources	Premises and facilities	<p>Bulgaria Professional School of Civil Engineering, Architecture and Geodesy "Angel Popov", Veliko Tarnovo</p> <ul style="list-style-type: none"> - 20 classrooms, 4 computer rooms, physics laboratories, chemistry laboratories, gym - Wi-Fi is available throughout the building during breaks (if necessary, during the hour) and internet connection is provided in all computer rooms - All rooms have multimedia equipment - Workshops for the classes and materials are provided - The school has 55 teachers, 15 of whom teach construction, interior design, geodesy and park construction 	<ul style="list-style-type: none"> - The school is working on many projects to offer quality vocational educational training - It is located in the city centre on a large area 	<ul style="list-style-type: none"> - A complete renovation of the building is currently underway and training is taking place in other buildings 	<ul style="list-style-type: none"> - New teaching practices in the field of BIM
	Technical equipment				
	ICT equipment and internet connectivity				
	Financial resources				
	Staffing				

Category	Indicators	Status quo	Strengths	Weaknesses	Needs
2. Curricula, courses and programs	<ul style="list-style-type: none"> - Structure of the curricula and integration of innovations - Progression of courses and programs, interdisciplinary elements - Quality and innovation of teaching and training material - Didactic guidance for teachers 	<ul style="list-style-type: none"> - The school runs programs approved by the Ministry of Education 	<ul style="list-style-type: none"> - A new curriculum for BIM design has been developed, - its implementation will start in 2022/2023 	<ul style="list-style-type: none"> - Credits and ECVET are not associated to the programs 	<ul style="list-style-type: none"> - New curricula in the field of interdisciplinary subjects
3. Staff competences	<ul style="list-style-type: none"> - Knowledge and skills on the topic - Digital skills 	<ul style="list-style-type: none"> - The school was partner in the project "Securing of Experts in the Construction Industry" 	<ul style="list-style-type: none"> - Some teachers are trained to work with the software AutoCAD, Revit, 3D Max 		<ul style="list-style-type: none"> - Higher quality training opportunities - Access to national funding

	<ul style="list-style-type: none"> - Innovative teaching methods - Project management expertise 				
4. Learning process	<ul style="list-style-type: none"> - Flexibility and formats for teaching and learning - Participatory approaches - Digital forms of learning / virtual learning environment 	<ul style="list-style-type: none"> - The current training offered is in line with current regulations - During the Covid crisis, distance learning environment was implemented on MS Teams 			<ul style="list-style-type: none"> - Higher quality training opportunities - Access to national funding for VET-Institutions

5. Networking and cooperation	<ul style="list-style-type: none"> - Networks Cooperation with higher education - Cooperation with companies - International cooperation (partner schools) - International projects) 	<ul style="list-style-type: none"> - Partnership with local construction companies 		<ul style="list-style-type: none"> - Construction companies experience difficulties to offer internships 	
6. Quality assurance, monitoring and assessment, development strategies	<ul style="list-style-type: none"> - Quality management system - Methods and tools for assessment of learning progress - Self-evaluation tools - Staff development processes - School development plan 				<ul style="list-style-type: none"> - Strengthening the dialogue with decision-makers - School development plan (regular check)

Category	Indicators	Status quo	Strengths	Weaknesses	Needs
1. School structure and resources	- Premises and facilities	<p>Poland Technical Vocational School for Construction (ZSB1)</p> <p>The school is located in two buildings (at Rybaki Street and Św. Jerzy Street).</p> <p>In both buildings of the school there are workshops for practical vocational training.</p> <p>In the school building at Rybaki Street there are <i>4 computer rooms</i> with permanent access to the Internet. In the school building at ul. St. Jerzy, there are 4 computer rooms with permanent access to the Internet. In each classroom there are about <i>14 computer workstations for students</i> equipped with appropriate software.</p> <p>The school uses funds from the local government and the ministry. In addition, a large financial support for the school is co-financing from the implementation of EU projects.</p>	<p>- Increased school premises (new school building at Św. Jerzy Street) - the school has two buildings</p> <p>- Modernized and equipped laboratories for practical vocational training (in both school buildings)</p> <p>- Participation of the school in EU projects</p> <p>- Good recruitment with particular emphasis on vocational training</p>	<p>- Aging IT and multimedia equipment in computer labs</p> <p>- Problem with systematic maintenance of IT and multimedia equipment in computer laboratories</p> <p>- High operating costs related to equipment and educated professions</p> <p>- A small number of computer labs in relation to the needs of vocational subjects</p> <p>- Occasional problems with the quality of the internet connection</p>	<p>- The need for systematic replacement of computer and multimedia equipment</p> <p>- The need for systematic maintenance of computer and multimedia equipment</p> <p>- Purchase of new computer programming necessary in vocational education</p> <p>- Increasing the number of computer labs</p> <p>- Increasing the quality of the internet connection</p>
	- Technical equipment				
	- ICT equipment and internet connectivity				
	- Financial resources				
	- Staffing				

		Recruitment at school has been very good for years. In the current school year, education will be carried out in 5 classes of a construction technical school (3 in the profession of a construction technician, 1 in the profession of a renovation technician of elements of architecture, and 1 in the profession of a ceramics technician) and 3 classes of the 1st degree industry school (3 multi-professional classes).			
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Category	Indicators	Status quo	Strengths	Weaknesses	Needs
2. Curricula, courses and programs	<ul style="list-style-type: none"> Structure of the curricula and integration of innovations Progression of courses and programs, interdisciplinary elements 	<p>All vocational curricula are subject-based. Some vocational curricula are proprietary curricula developed by a team of vocational teachers.</p> <p>The others are modelled on the studies of the Education Development Center - ORE.</p> <p>Each of the curricula has been developed in accordance with the assumptions of the curriculum Basis for vocational education, which is specified by the Ministry of Education and Science.</p>	The school has proprietary teaching programs in professions	Lack of provision of didactic materials for vocational training on the part of the ministry - core curricula not adapted to the labour market	Access to a larger database of teaching materials, e.g. textbooks, multimedia materials, etc.

	<ul style="list-style-type: none"> - Quality and innovation of teaching and training material - Didactic guidance for teachers 	<p>Each core curriculum contains specific learning outcomes in a given profession that must be realized and there is a certain freedom as to the use of computer software in the field of education in a given profession by the teacher.</p> <p>Teaching materials are prepared / developed by each teacher on their own</p>			
3. Staff competences	<ul style="list-style-type: none"> - Knowledge and skills on the topic - Digital skills - Innovative teaching methods - Project management expertise 	<p>Qualified teachers for vocational education - both theoretical and practical. Many teachers are certified examiners and cooperate with OKE, cooperation with CKE.</p> <p>Teachers of vocational subjects, while implementing the project method, use the skills of using computer programs used in construction such as: AutoCAD, ARchiCAD, NORMA PRO.</p>	<ul style="list-style-type: none"> - Qualified teachers - Knowledge of the use of computer programs used in construction by teachers 	<ul style="list-style-type: none"> - Insufficient financial resources for teacher training 	<ul style="list-style-type: none"> - The need for further training of teachers in vocational education and digital skills used in the profession

<p style="text-align: center;">4. Learning process</p>	<ul style="list-style-type: none"> - Flexibility and formats for teaching and learning - Participatory approaches - Digital forms of learning / virtual learning environments 	<p>In the process of vocational education, apart from application methods, there are also methods consisting in working in groups. The type of method used depends on the teacher.</p> <p>One of the methods used is the design method. In this method, students use appropriate computer software to complete a given design exercise. In addition to working in class, students can work remotely via the Internet.</p>	<p>Adapting young people to the labour market through the use of different teaching methods</p>	<p>The risk of discrepancies between the learned skills and the examination requirements</p>	<p>Adaptation of examination requirements to different forms of teaching</p>
<p style="text-align: center;">5. Networking and cooperation</p>	<ul style="list-style-type: none"> - Networks Cooperation with higher education - Cooperation with companies - International cooperation (partner schools) 	<p>The Complex of Construction Schools No. 1 in Poznań cooperates with the following universities:</p> <ul style="list-style-type: none"> - Poznan University of Technology - University of Arts in Poznań - University of A. Mickiewicz in Poznań - High School of Social Psychology, - University of Social Sciences and Humanities in Poznań. <p>The Complex of Construction Schools No. 1 in Poznań cooperates with the following companies:</p>	<ul style="list-style-type: none"> - Practical training of construction technicians according to the Finnish model of education - International exchange of students in the implementation of apprenticeships 	<ul style="list-style-type: none"> - Formal problems with the implementation of foreign education models - Organizational and financial problems related to foreign exchange of students - Low knowledge of foreign languages by teachers who do not teach a foreign language 	<ul style="list-style-type: none"> - Acquiring more companies enabling practical apprenticeship to students - The necessity to subsidize the teaching of foreign languages by teachers

	<ul style="list-style-type: none"> - International projects 	<ul style="list-style-type: none"> - Pekabex - Konbet Poznań - RBW - Apartments in tenement houses - Caparol International cooperation Partner Schools: <ul style="list-style-type: none"> - The Center of Excellence in Construction from Moldova - Federation of Vocational Schools in Finland - Junior High School John Paul II in Vilnius International projects: <ul style="list-style-type: none"> - Malwe - Deutsch plus - Teamwork interkulturell - Cooperation builds - Ecological and innovative technologies of industrial land reclamation from the point of view of LCA and energy efficiency - We build experience - foreign internships as a path to success. 	<ul style="list-style-type: none"> - Cultural exchange - Familiarizing the student with the future environment of further study and work in Poland and abroad - Enabling students to acquire professional and language skills 		
6. Quality assurance, monitoring and assessment, development	<ul style="list-style-type: none"> - Quality management system - Methods and tools for assessment of learning progress 	<p>Quality management system:</p> <ul style="list-style-type: none"> - Preparing students for vocational exams and analysing the results, - Preparing students for subject olympics and analysis of the results obtained. Good quality of education is influenced by: - Qualified teaching staff 	<ul style="list-style-type: none"> - Very good results of professional exams, - Annual laureates and finalists of the Construction Olympics - For several years, the school's high position in the "Perspektywy" Ranking, including the 	<ul style="list-style-type: none"> - Teacher shortages - Low knowledge of foreign languages by teachers who do not teach a foreign language - Lack of funds for additional activities developing students' interests and skills 	<ul style="list-style-type: none"> - Continuous professional development of teachers - Co-financing of foreign language learning for teachers who do not teach a foreign language

	<ul style="list-style-type: none"> - Self-evaluation tools - Staff development processes - School development plan 	<ul style="list-style-type: none"> - Willingness to develop the teaching staff through various forms of professional development, - Very good results of professional exams, - obtaining the titles of finalists and laureates in subject Olympiads, - Employment of graduates in positions consistent with their education 	<p>status of the "Golden School"</p> <ul style="list-style-type: none"> - High quality of education translates into high interest in the school among students 		
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Category	Indicators	Status quo	Strengths	Weaknesses	Needs
1. School structure and resources	- Premises and facilities	Finland JEDU Vocational Educational Centre	- JEDU is a big education provider. Economy is good, Federation of Education has no debt. There are resources available for development. Situation is different in different units.	- There are some differences between the units. Interior builder premises need new equipment and refinishing.	In Kalajoki and in Haapavesi is a need new updated layout. There is also need of proper dust management systems in workspaces.
	- Technical equipment	Every JEDU unit has a lot of classrooms and teaching space. Construction programs are located in four different units (Interior builder -programs in Kalajoki and in Piippola.		- It is not always possible to go according to the curriculum.	
	- ICT equipment and internet connectivity			- Lack of resources and lack of supervisors.	
	- Financial resources	In Haapavesi: Warm construction hall, 90 square meters, half warm hall 90 square meters, working hall 380 square meters.	-There are good conditions at the building sites. The aim is to do customer work, serve the surrounding working life and private customers. It is genuinely thought that work can be done for customers. The customer gets the products they want.	- Scheduling at an appropriate time is sometimes difficult. Weather conditions also affect. The seasons are limiting possibilities when to start building.	
	- Staffing	Construction material storage hall 144 square meters, common classrooms and computer classrooms. Two bigger construction sites under construction at the moment. One house to build every year best for teaching purposes. Every unit has own trailers, tool trailers, electric tools and air pressure tools. There is also integrated circular and other saws in trailers. All needed tools are provided to students.	- Customer oriented client works makes it easier for the teacher to keep up with the working life.	- Continuous application process is an additional challenge. In customer-oriented building there is not always suitable work available for students on time. - Teachers must know in the spring what are the autumn schedules	

		<p>There is also a CNC - machine for interior decoration elements. Plane line for wooden materials.</p> <p>Piippola: interior design Indoor workspaces, temporary workspaces, 500 square meters of workspace.</p> <p>Carpenter's tool, circular saws, cutting saws, band saws, planers, CNC machine. interior designers' exercise spaces for tiling and wallpapering. Drawing screen, VR technology available.</p> <p>Nivala: Element Hall for prefabricated houses. Space for the interior builders 500 square meters. Element table and cranes. Element tools, interior designers' workspaces. Training booths. Cranes for elements to be lifted to storage facilities, racks for the elements. Basic wood construction tools. Lifts used in property maintenance. Storage space for construction materials.</p> <p>Kalajoki: Theory class for construction program own use, two warm halls, 300 square meters. Storage facilities with</p>	<p>- We know what we do and who are our clients</p>		
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		<p>building materials, storage space 200 square meters. Construction sites, Terraced house, detached house, Industrial hall</p> <p>All wooden material comes from the local sawmills.</p> <p>Use of Customer drawings, personal panel and interior decoration selections.</p> <p>One interior builder class and a computer class for the interior builders. In connection with the class there is a CAVE - system, where VR glasses can be used.</p> <p>A holiday home made as a student work for JEDU for the 2014 holiday housing fair.</p> <p>There are sensors in the outside walls. Ekovilla insulation, humidity measurement.</p> <p>ICT: Good network connections, online learning opportunities. Its Learning -network teaching and learning system. CAD, CADS and Autocad systems. Images are printed on your own printers.</p>			
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		<p>The pictures are drawn by teachers and students. A3, A2, A1 size can be printed.</p> <p>Own cars to transport students to construction sites. Trailers and tool carts.</p> <p>Vocational education reform in Finland 2018. Construction is a popular program and there are a lot of interested students both young and adults.</p> <p>Construction program is for three years and last year is at the world of work (two + one - model). There are a lot of workplaces available for graduated students.</p>			
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<p style="text-align: center;">2. Curricula, courses and programs</p>	<ul style="list-style-type: none"> - Structure of the curricula and integration of innovations - Progression of courses and programs, interdisciplinary elements - Quality and innovation of teaching and training material - Didactic guidance for teachers 	<p>Vocational education reform in Finland 2018.</p> <p>Construction is a popular program and there are a lot of interested students both young and adults.</p> <p>Construction program is for three years and last year is at the world of work (two + one - model). There are a lot of workplaces available for graduated students.</p>	<ul style="list-style-type: none"> - Every student has a personal learning plan. Quality matters are very important, customers want to have good flawless qualities at the reasonable price. - Student construction work must be as good as professional construction work. Quality in building sites, different measurement of water and steam resistant constructions. - Infrared camera measurements. - Humidity measurements. - Finished houses are sold at the market price. 		<ul style="list-style-type: none"> - There is a big challenge that the education and teaching is customer oriented. Programs are updated every year. - On challenge is to fit compulsory and voluntary subjects together. - Practise at school premises before world of work. - Flexible programs, our duty is vocational education, we are not construction company.
<p style="text-align: center;">3. Staff competences</p>	<ul style="list-style-type: none"> - Knowledge and skills on the topic - Digital skills 		<ul style="list-style-type: none"> - Teachers are graduated from the University of Applied Sciences. 	<p>The lack of supervisors is a problem when it comes to distributing a student to different construction sites. There has to be work available for the whole group.</p>	<ul style="list-style-type: none"> - Too little time for own personal learning and teaching premises development. - There is not enough time for 5S development.

	<ul style="list-style-type: none"> - Innovative teaching methods - Project management expertise 		<ul style="list-style-type: none"> - Construction engineer, teacher education (pedagogy). Knowledge of the latest knowhow from the construction. - Master's Degree of the University of Applied Sciences (YAMK) - School of professional Teacher Education. Updated skills and education. - Master's Degree at the University of Applied Sciences (not graduated yet) (KAMK) - Project Management Education. construction projects. - Virtual learning during COVID-19 - times. - Otherwise practise on site 	<p>Second year students can be put to work independently but first year students are in the responsibility of the teacher.</p>	<ul style="list-style-type: none"> - Construction is progressing rapidly all the time. It is the challenge to keep up with the latest developments. - Short teacher exchange periods at the construction companies for skills updating.
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<p style="text-align: center;">4. Learning process</p>	<ul style="list-style-type: none"> - Flexibility and formats for teaching and learning - Participatory approaches - Digital forms of learning / virtual learning environments 	<p>Too little Virtual Reality technology at use in everyday work. Virtual Reality -technology is available. Everyday use is a challenge.</p> <p>Holiday Cabin Fairs for interior builders. CAVE -environment. Modelled environment for interior decoration and interior building</p> <p>All teaching material and books are in the virtual learning environment. Holiday home fair. CAVE environment for interior designers. Modelled environment, how the interior, doors, colours look like. 3D modelling.</p> <p>Measurement technology has advanced to a large extent.</p> <p>Mobile phone can be used for learning.</p>	<ul style="list-style-type: none"> - Being on a practical site asks learning meaningful from a student perspective. - Renovation and dismantling are not always a motivating thing. - Professional staff. Dressing facilities, dining areas, reasonable transition times. Effective study time. - Work safety at a good level, safety culture improved. 		<p>New programs and VR and AR -teaching tools are needed at the vocational education.</p>
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Category	Indicators	Status quo	Strengths	Weaknesses	Needs
5. Networking and cooperation	<ul style="list-style-type: none"> - Networks Cooperation with higher education - Cooperation with companies - International cooperation (partner schools) - International projects) 	<p>Oulu University of Applied Sciences Centria University of Applied Sciences.</p> <p>Master´s degree at Finnish Univesities of Applied Sciences. Pedagogical Studies Practise at the Vocational Education Providers. Professional expertise enhancement.</p>	<p>OAMK Highway: Further studies at the University of Applied Sciences during studies at the vocational education. Laboratories and Test environments.</p>		

<p style="text-align: center;">6. Quality assurance, monitoring and assessment, development strategies</p>	<ul style="list-style-type: none"> - Quality management system - Methods and tools for assessment of learning progress - Self-evaluation tools - Staff development processes - School development plan 	<p>Plan for evaluation. EFQM -model. European Framework of the Quality Management. EFQM -malli. KARVI -arviointi. Koulutuspäivät JEDU strategia Kiinteistöstrategia Strategiahankkeet.</p>	<ul style="list-style-type: none"> - Finnish Education Evaluation Centre (KARVI) Vocational education unit. Learning outcome evaluations. Thematic and system evaluations. Evaluations of quality management. - Learning outcomes evaluations will study whether the objectives of the vocational upper secondary qualification and professional competence required in working life are attained. - In addition, competence in common units that are part of vocational upper secondary qualifications is evaluated. 		<p>More education for construction quality management.</p>
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			<ul style="list-style-type: none"> - The quality of VET providers' pedagogical activities and its link with learning and competence is also evaluated in the learning outcomes evaluations. - Thematic evaluations support decision making and development of education - The aim of thematic evaluations is to produce information to support decision making and the development of education. - The theme of the evaluation may concern a single area or a wider topic. The themes often cover areas that are important with regard to educational policy. 		
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			- FINEEC evaluates VET providers quality management and supports providers in matters concerning evaluation and quality management.		
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Category	Indicators	Status quo	Strengths	Weaknesses	Needs
1. School structure and resources	<ul style="list-style-type: none"> - Premises and facilities - Technical equipment - ICT equipment and internet connectivity - Financial resources - Staffing 	Germany Berufsförderungswerk der Bauindustrie Berlin-Brandenburg e.V., BFW-BB	<ul style="list-style-type: none"> - 3 BFW-BB centers for practical training in Cottbus/Brandenburg a.d.H./FFO - 14 modern workshops with approx. 300 m² each and 16 workstations + the corresponding tools - PC equipment for all employees - Mobile digital working - Employees develop and work with interactive learning methods - Continuous involvement of the staff in national and international projects 		

Category	Indicators	Status quo	Strengths	Weaknesses	Needs
<p style="text-align: center;">2. Curricula, courses and programs</p>	<ul style="list-style-type: none"> - Structure of the curricula and integration of innovations - Progression of courses and programs, interdisciplinary elements - Quality and innovation of teaching and training material - Didactic guidance for teachers 		<ul style="list-style-type: none"> - Practical training according to the 4-step method (prepare/demonstrate /follow up /practice) - Use of digital learning units and short video sequences - Development and application of analog/digital/ interactive learning units 		

3. Staff competences	<ul style="list-style-type: none"> - Knowledge and skills on the topic - Digital skills - Innovative teaching methods - Project management expertise 		<ul style="list-style-type: none"> - All trainers come from the business world with extensive practical experience - Pedagogical training via AEVO - Trainers are active in the relevant examination boards - working with digital media - Preparation of digital learning units - Part of the staff has PM experience in nat. and intern. Projects - Support of the projects by the management level 		
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<p style="text-align: center;">4. Learning process</p>	<ul style="list-style-type: none"> - Flexibility and formats for teaching and learning - Participatory approaches - Digital forms of learning / virtual learning environments 		<ul style="list-style-type: none"> - BIM (Building Information Modeling) based construction training - Trainees learn how to use the software and can filter and use relevant information from digital building models - Use of digital construction machines - simulators - Digital surveying 		
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Networking and cooperation	<ul style="list-style-type: none"> - Networks Cooperation with higher education - Cooperation with companies - International cooperation (partner schools) - International projects) 		<ul style="list-style-type: none"> - Cooperation with the respective vocational schools at the locations cooperation with the companies providing the training - Cooperation with the chambers - Cooperation with universities competence networks - Cooperation with the other educational centers of the construction industry from the other federal states - Cooperation with international vocational high schools, vocational training centers and universities 		
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<p style="text-align: center;">5. Quality assurance, monitoring and assessment, development strategies</p>	<ul style="list-style-type: none"> - Quality management system - Methods and tools for assessment of learning progress - Self-evaluation tools - Staff development processes - School development plan 		<p>QM System DIN ISO 9001-2015</p>		
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2. Good Practices

Finland Vocational Centre JEDU / The Federation of Education in Jokilaaksot

Two main good practices in JEDU:

Studies are at the real life and market situations. Teachers teach according to the latest construction knowledge. Students study at the real-life working situations.

Construction happens in a modular way. Parts of the building will be made at the construction hall with the machinery and tools and all the house parts will be put together at the construction site. Building process at the site is fast and weather proof.

Building for customer needs at the market price

Customer oriented building process. JEDU buys a property, does the planning and gets all the permissions and licences from the city construction office. Teachers supervise the building process. Students do the building. House will be sold at the market price to a customer at the open market. There are some benefits which are important:

1. Student study and work in real life construction situations.
2. Students do all construction work at the building site (tiling, wallpapering, etc.).
3. Students learn building methods from start to finish.
4. Student are ready to the world of work after graduation and know the whole building process from start to finish.

Modular building process, prefabricated house



All parts to the house will be made inside in a weather proof conditions. The elements will be made as ready as possible at the construction hall before transporting them to the construction site. This method has a lot of benefits:

1. Efficient use of building materials.
2. Machinery and tools at the construction hall.
3. Recycling of building materials and plastic.
4. Energy efficient building process.
5. Good and stable building quality.
6. Safe working environment for the students.

This building method suits also for log house and log cabin building.

Poland Vocational Complex of Construction Schools No. 1 in Poznan

An example of Good Practices at the Complex of Construction Schools No. 1 in Poznan is the project "We Build Together", which was innovative on a national scale, which was implemented until 2019. The project was based on the Finnish model of education and was aimed at the target group of students training in the profession of a construction technician. The project was implemented between:

- Construction School Complex No. 1 in Poznan  **Rybaki17**
- the construction company RBW 

Regulation

The project was in line with the assumptions contained in the Regulation of the Minister of National Education on practical vocational training.



The RBW company, enabling students to carry out apprenticeships on the construction site, could participate in the educational process, thus gaining potential employees in the near future.

We Build Together

The innovative project "We Build Together", modeled on the Finnish model of education, assumed the participation of students, as part of the implementation of apprenticeships, in the construction process. This process consisted in the construction of a semi-detached residential building under the supervision of specialized construction teams (one half of the semi-detached house was built by a construction company, and the other half by students). The construction investment was carried out in Tulce near Poznan. The method of simultaneously learning a profession in real conditions (on a construction site) and building a facility that will be used increases the motivation of students and attracts them to learn in the profession.

The innovative project "We Build Together" is a transferable method. As a school, we can act as an example for other schools and share our own experience gained during the implementation of "We Build Together". The marketability of the project is also evidenced by the fact that it was modeled on the Finnish model of education - i.e. the borrowed model.



BUDUJEMY RAZEM

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CGK
WIEJSZANNA COOPERATIVE

JEDU
THE FEDERATION OF EDUCATION IN OKLAHOMA

zobacz >>>

The project was implemented without any financial outlays for either party. The apprenticeship contract concluded between the school and the RBW construction company covered only the apprenticeship process without the payment of remuneration to students.

The implementation of practical classes under the project "We Build Together" had a measurable and positive result on educating students in the profession of a construction technician. In addition to the practical skills that the student acquired while implementing the construction investment as part of the project, he also experienced a sense of satisfaction with the implementation of a real project.

Further Good Practices

National and international didactic projects orientated on work on the construction site:

- project POLLUB - teachers overworked the program, making themselves RC structure and masonry, surveying
- Centre of Career on PUT <https://cpk.put.poznan.pl/>
platform linking the students and industry - more than 1000 offers and 200 attending students at Faculty of Civil Engineering and Transport PUT - obligatory four weeks in Summer holiday, tracking the professional and economical carriers of graduated students, digital platform: <https://ela.nauka.gov.pl/pl>

Practical training courses included in regular study program:

- surveying practise - 2 weeks, 3 ECTS
- geology and geotechnical practise - 2 weeks, 3 ECTS
- engaging students to carry out work for industry carried out academics

Laboratory classes at:

- Interinstitutional Laboratory of Building Structures (tensile and compression tests on Instron machine, three- or four-point bending tests on full scale structural elements such as beams or plates, columns)
- Laboratory of Building Materials and Chemistry: climatic chamber, chemical and physical properties of different constructional materials

Digital and innovative tools for practical training in building design:

- computer laboratory of structural analysis: Abaqus, Robot, AxisVM, Soldis
- BIM technology software: Revit, Archicad, BIMEstimate
- technical querenda on the building site
- digital platform for supporting learning activity linking teachers and students: flashcards, videos, tutorials, quizzes (moodle, eKursy)
- hybrid teaching - on site and remotely, online asynchronous and synchronous

Future perspectives and strategies:

- learning support centre - selfwork classroom for small group and individual work, recording room
- digital and innovativ technology centre in constructional sector: equipped with 3D scanner, photogrammetry, drones, thermovision cameras, VR tools
- change in the teaching curricula: increasing amount of practical courses like projects, seminar and laboratories instead of lectures
- providing practical classes in cooperation with industry by the study case and study visits at the building sites which can result in further cooperation and diploma thesis

Hazard and difficulties:

- lack of sufficient financial support from government orientated on technical professions
- need of realization of practical classes in small groups of students
- excessive bureaucracy in comparison to contact time with students
- decrease in the birth rate

Germany Berufsförderungswerk der Bauindustrie Berlin-Brandenburg e.V., BFW-BB

Good Practices

School structure and resources:

- Workshops according to occupational field
- PC instructors, teachers and remaining staff
- PC cabinet for trainees
- class set of tablets
- interactive monitor
- 1 employee responsible for digital media
- all instructors develop work tasks digitally
- for more than 20 years cooperation and experience in project work (nat. and intern.)

Curricula, courses and programs – Adaptation of learning units from the projects:

- [Fit for BIM](#)
- [Umbau&Ko](#)
- [KoTransfer](#)
- [DigiCon](#)
- [B³aus](#)
- [DALiB](#)

Staff competences:

- e.g. from building construction and civil engineering companies
- regular further training on the training days during the preparation week in August and when it fits into the training schedule
- preparation test in Forms for the exams
- preparation/creation of digital learning tasks
- PM in ERASMUS+ projects
- PM in Interreg projects with polish partners

Learning process:

- from July 2023 use results of the B³aus - Project (BMBF and BiBB)
<https://www.foraus.de/de/themen/b3aus-131590.php>
- from July 2023 use of the results from the DALiB project (BMBF and BiBB)
<https://www.foraus.de/de/themen/dalib-131593.php>

Networking and cooperation:

- OSZ 1 in Cottbus
E.g. EUROVIA, STRABAG; Autobahn GmbH (...)
- Cottbus Chamber of Commerce
- BTU Cottbus/Senftenberg and TU Berlin
- Competence network construction & energy
- Training centers of the construction industry in Saxony/Thuringia/Hamburg/Saxony-Anhalt/ Mecklenburg- Pomerania, ...)
- PUT in Poznan, ZSBI in Poznan, Belgium, Italy, Finland
- vocational high schools in Bulgaria /Romania /Poland /Latvia /Belgium

Quality assurance, monitoring and assessment, development strategies:

- Annual auditing of the 3 training centers of BFW-BB

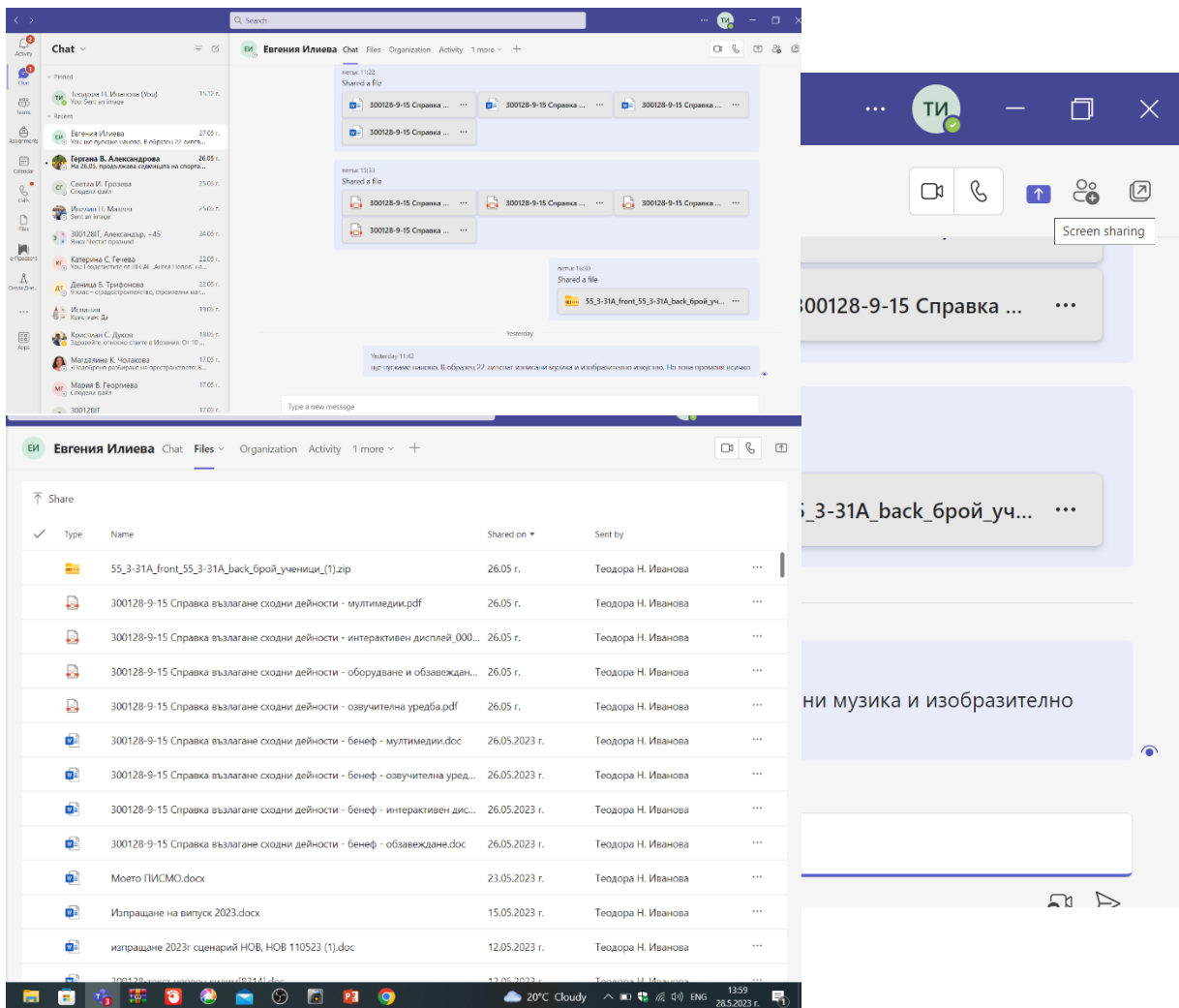
Bulgarian Professional School of Civil Engineering, Architecture and Geodesy

Digital learning

Resources of digital learning in the school:

- National Learning Platform
- Suitable for the home office
- Unlimited access - teachers, students and parents

MS Teams



Digital backpack

<https://edu.mon.bg/weekly-schedule?selectedDate=2023-04-17>

Alles Gute zum Geburtstag! – Vor dem Start
 Предмет: Немски език
 Клас: 7 клас

1. Wechselpaerpositionen | Grammatik - Kardinalzahlen, Ordinalzahlen, Genitiv flexive
 Reflexivpronomen | винителен | дателен | падеж | смесени | предлози | Wechselpaerpositionen | числителни думи
 числителни | релни | бројни | Ordinalzahlen | правила | изключения | gama | рогителен падеж | Genitiv | образува

2. Wechselpaerpositionen | Grammatik - Kardinalzahlen, Ordinalzahlen, Genitiv flexive
 Reflexivpronomen | винителен | дателен | падеж | смесени | предлози | Wechselpaerpositionen | числителни думи
 числителни | релни | бројни | Ordinalzahlen | правила | изключения | gama | рогителен падеж | Genitiv | образува

Teachers book

SHKOLO
 PGSA "Ангел Попов" - Велико Търново

4.62 Гласа
 67996 Точки
 56323 Отсутствия
 3751 Точки
 93% Включителна честотност
 62 СЪБИТИЯ

СРЕДЕН УСПЕХ (ПО ПРГМАТИЦИ)
 СРЕДНО ОТСУСТВИЕ (ПО СЕДМИЦИ)

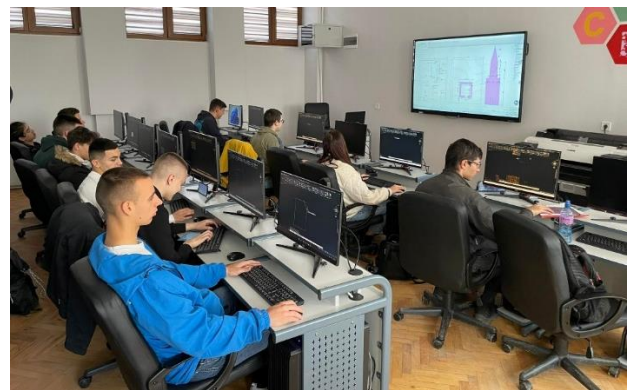
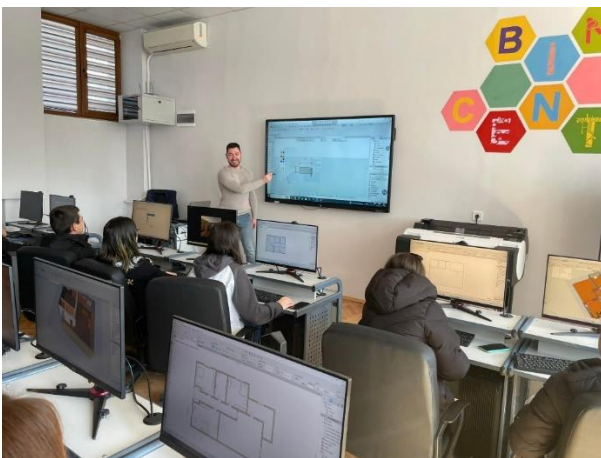
МАРКИРАЙ ЧАСА КАТО ВЪЗЕ
 ВИД ОБУЧЕНИЕТО
 УЧЕНИЦИ

Ученик	Отсутствия	Текуща оценка	Отзив
2. Атанасов, А. Тодорски	3, 3, 4	2, 2, 2, 2, 2	Избери...
4. Георгиев, Г.	4, 4, 4	2, 2, 2, 2, 2	Избери...
6. Димитров, С. Катина	4, 4, 4	2, 2, 2, 2, 2	Избери...
7. Димитров, М. Атанасов	3, 4, 3	2, 2, 2, 2, 2	Избери...
8. Илиев, Й. Христо	3, 4, 3	2, 2, 2, 2, 2	Избери...
9. Илиев, М. Тодорски	4, 3, 3, 3	2, 2, 2, 2, 2	Избери...
10. Илиев, М. Тодорски	4, 3, 3, 3	2, 2, 2, 2, 2	Избери...
11. Илиев, М. Тодорски	4, 3, 3, 3	2, 2, 2, 2, 2	Избери...
12. Илиев, М. Тодорски	4, 3, 3, 3	2, 2, 2, 2, 2	Избери...

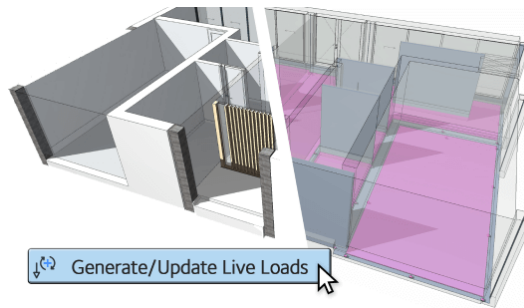
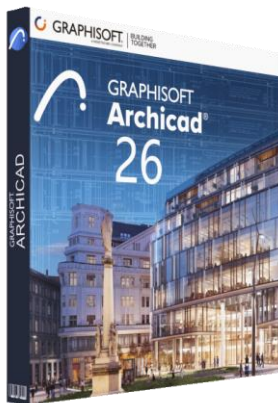
3. Digital teaching

An example of digital teaching of a construction subject: BIM Construction as learning program through 3D.

Integrating BIM software as a STEM practice

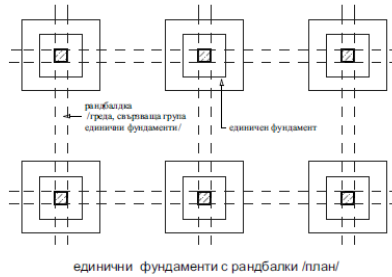
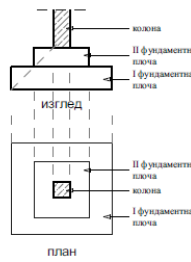


Tools

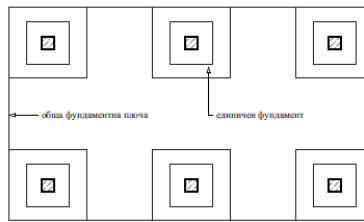


Application of BIM in theoretical classes

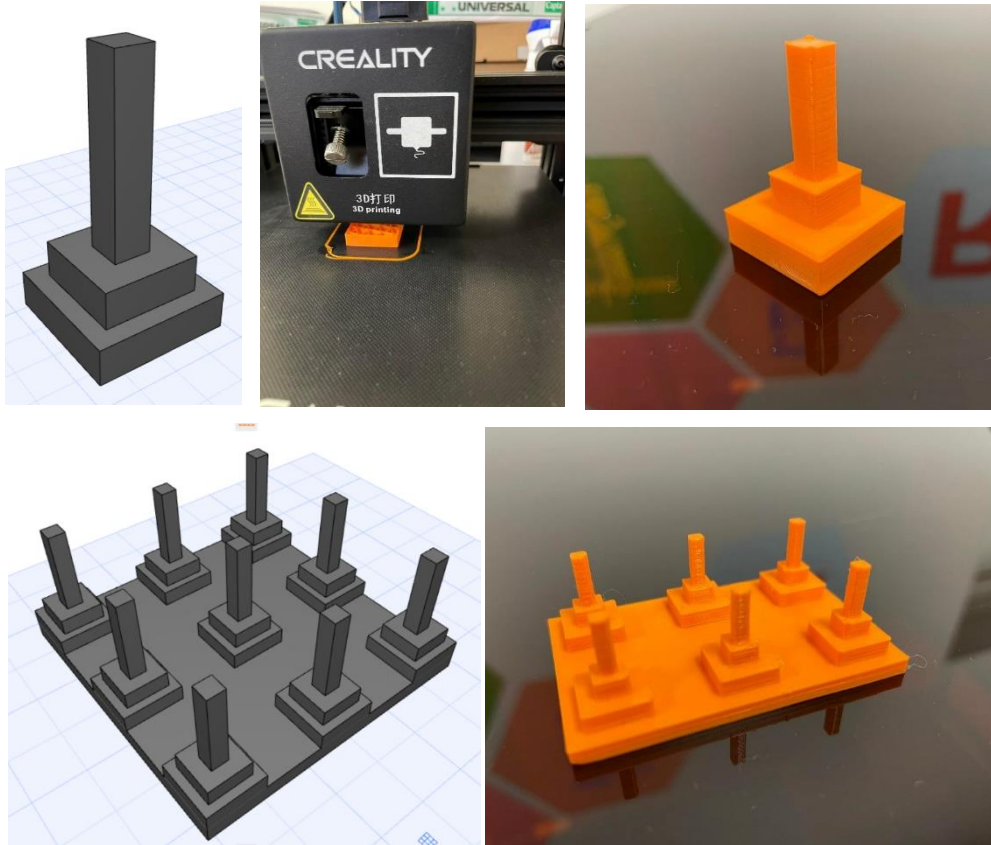
единичен фундамент



фундаментна плоча



единични фундаменти с рандбалки /план/



Nature of the experiment: Practical tasks

САМОСТОЯТЕЛНА РАБОТА:

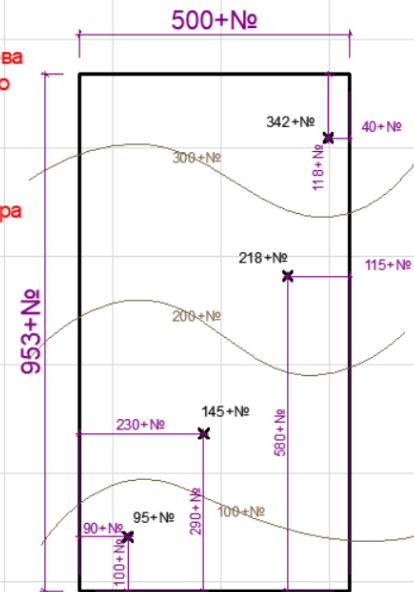
1. Да се настройт мерните и чертожни единици за работа в см
2. Да се изчертае следният терен с индивидуални настройки:
 - * всички четни номера:
 - вид на линията - непрекъсната
 - дебелина на линията 0,5
 - цвят на линията зелен (тон по избор)
 - вид на spline - пунктиран (long dash)
 - дебелина на spline 0,35
 - цвят на spline кафяв (тон по избор)
 - * всички нечетни номера:
 - вид на линията - непрекъсната
 - дебелина на линията 0,7
 - цвят на линията лилав (тон по избор)
 - вид на spline - пунктиран (long dash)
 - дебелина на spline 0,18
 - цвят на spline червен (тон по избор)
3. Да се изчисли местоположението на геодезическите точки и да бъдат отбелязани и надписани с индивидуалните им размери

ЗАБЕЛЕЖКА:

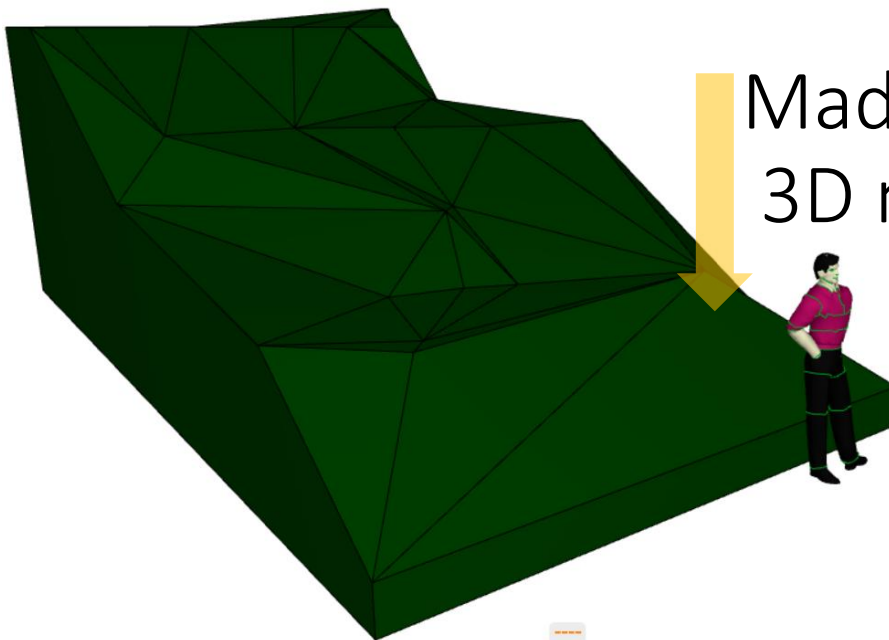
Видът и местоположението на spline са приблизителни, но трябва максимално да се доближават до дадения пример.

Височините на геодезическите точки се пресмятат като към зададената кота се добавя номера в клас

Котите на хоризонталите се пресмятат като към зададената кота се добавя номера в клас



The task



Made with
3D model

Other practical tasks

САМОСТОЯТЕЛНА РАБОТА:

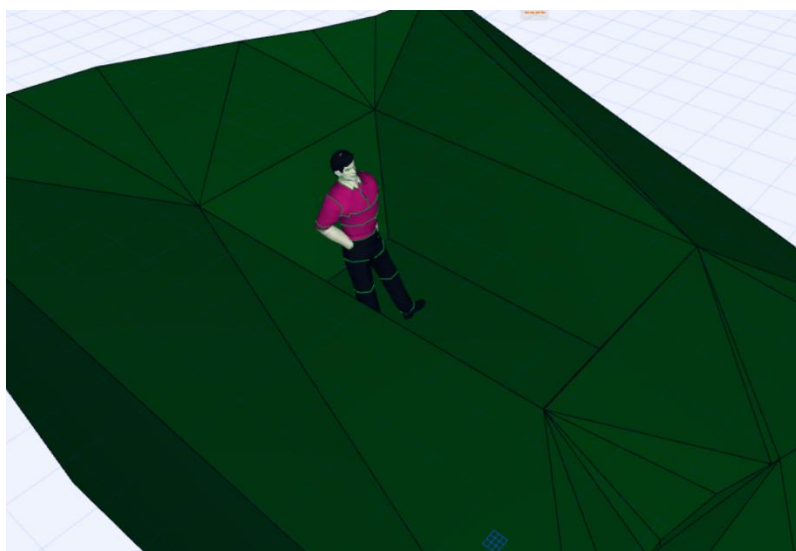
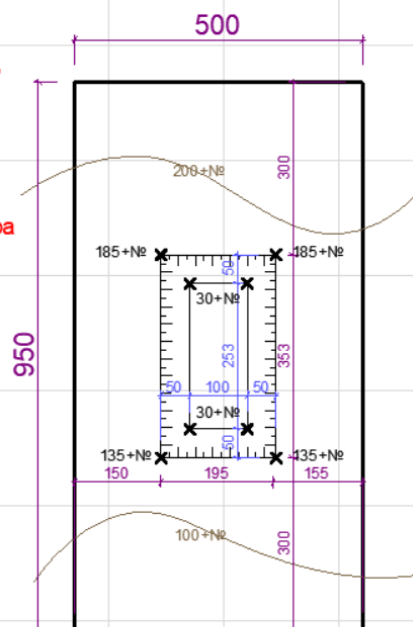
1. Да се настройят мерните и чертожни единици за работа в см
2. Да се изчертае следният терен с индивидуални настройки:
 - * за всички номера:
 - вид на линията - непрекъсната
 - дебелина на линията 0,5
 - цвят на линията черен
 - вид на spline - непрекъсната
 - дебелина на spline 0,18
 - цвят на spline сив (тон по избор)
3. Да се изчисли местоположението на изкопа по геодезическите точки и да бъдат отбелязани и надписани с индивидуалните им размери
4. Да се отговори какъв е типа почва, отчитайки скоса на изкопните стени - твърди, средно твърди или слаби

ЗАБЕЛЕЖКА:

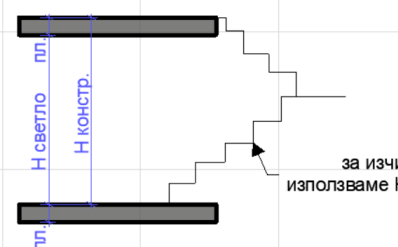
Видът и местоположението на хоризонталите са приблизителни, но трябва максимално да се доближават до дадения пример.

Височините на геодезическите точки се пресмятат като към зададената кота се добавя номера в клас

Котите на хоризонталите се пресмятат като към зададената кота се добавя номера в клас

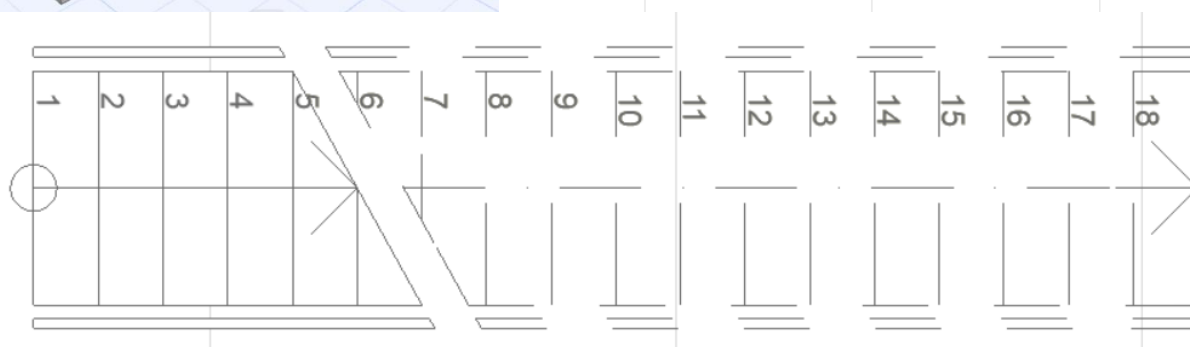
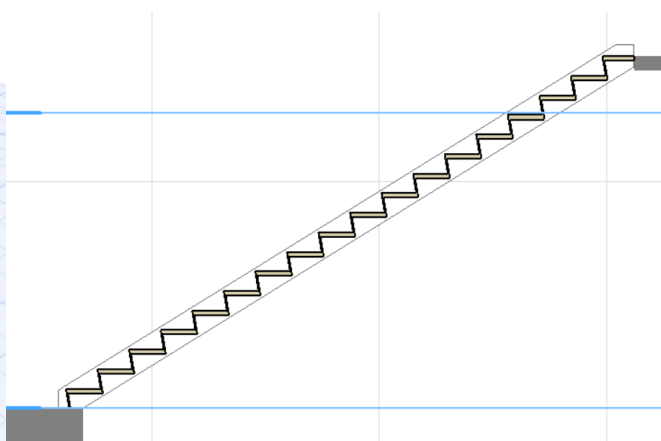
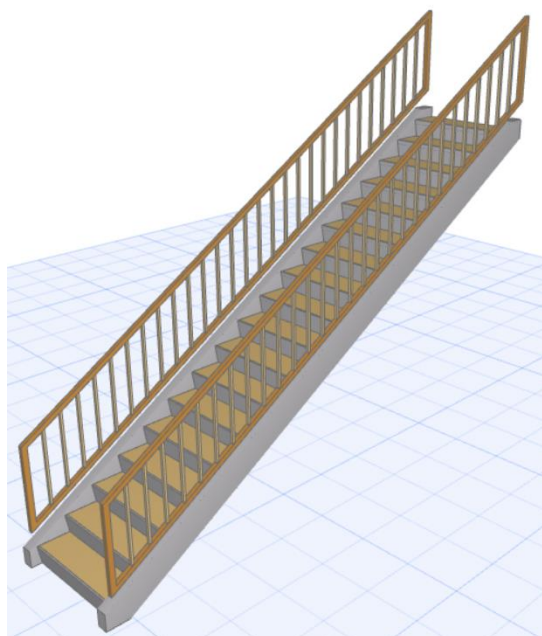


Other practical tasks



САМОСТОЯТЕЛНА РАБОТА:

1. Да оразмери и изчертае права стълба при конструктивна височина $H_k = 256 + N_e$
2. Изчисленията да бъдат подробно описани
3. Стълбата да се изчертае в план и разрез
4. Да се генерира в 3D



Other practical tasks

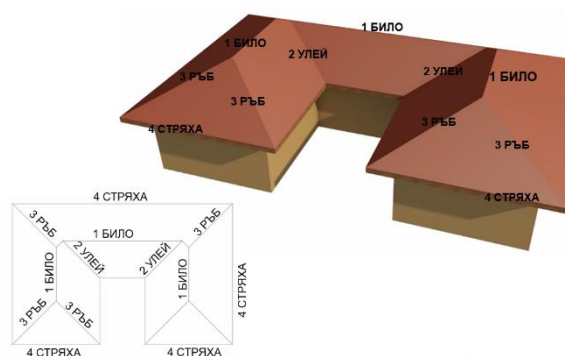
2. Части на покрива:

- ПOKРИВНА ПOKРИВКА
- ОБШИВКА
- ПOKРИВНА КОНСТРУКЦИЯ

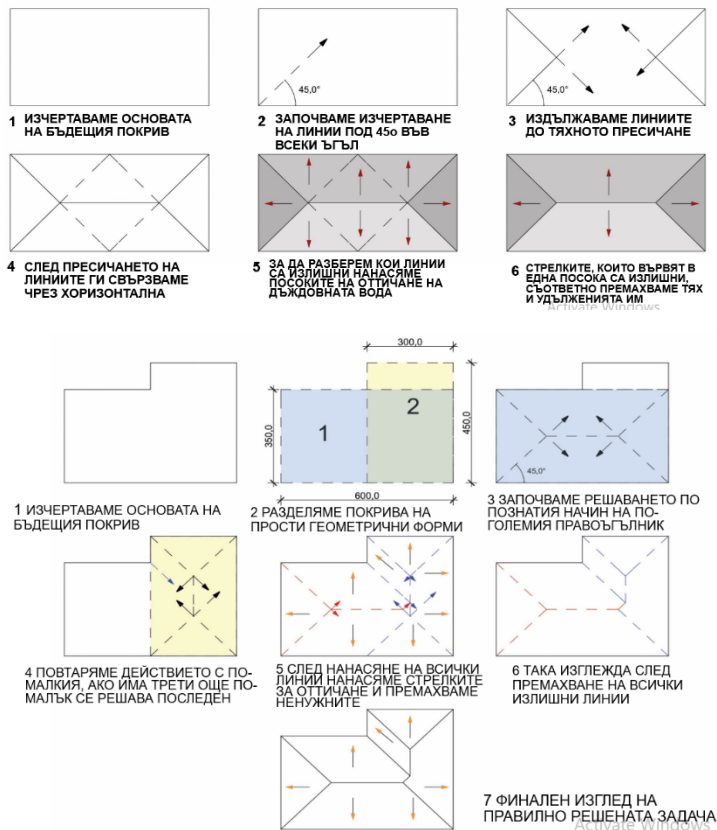


4. Видове покривни линии:

- КАПЧУК
- СТЯХА
- РЪБ
- УЛЕЙ
- БИЛО



5. Правила и методи при решаване на покривни линии:



Project Partnership:



Coordinator

BGZ Berliner Gesellschaft
für internationale Zusammenarbeit mbH
www.bgz-berlin.de
Pohlstraße 67, DE – 10785 Berlin



Germany

Berufsförderungswerk der Bauindustrie
Berlin-Brandenburg e. V.
www.bfw-bb.de



Poland

Politechnika Poznańska
www.put.poznan.pl



ZSB1

www.zsb1.poznan.pl



Bulgaria

PGSAG „Angel Popov“
<https://pgsagapvt.alle.bg/>



Rumania

Mancom GmbH
<http://www.mancomgmbh.de/>



Finland

JEDU Vocational Educational Centre
www.jedu.fi

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