

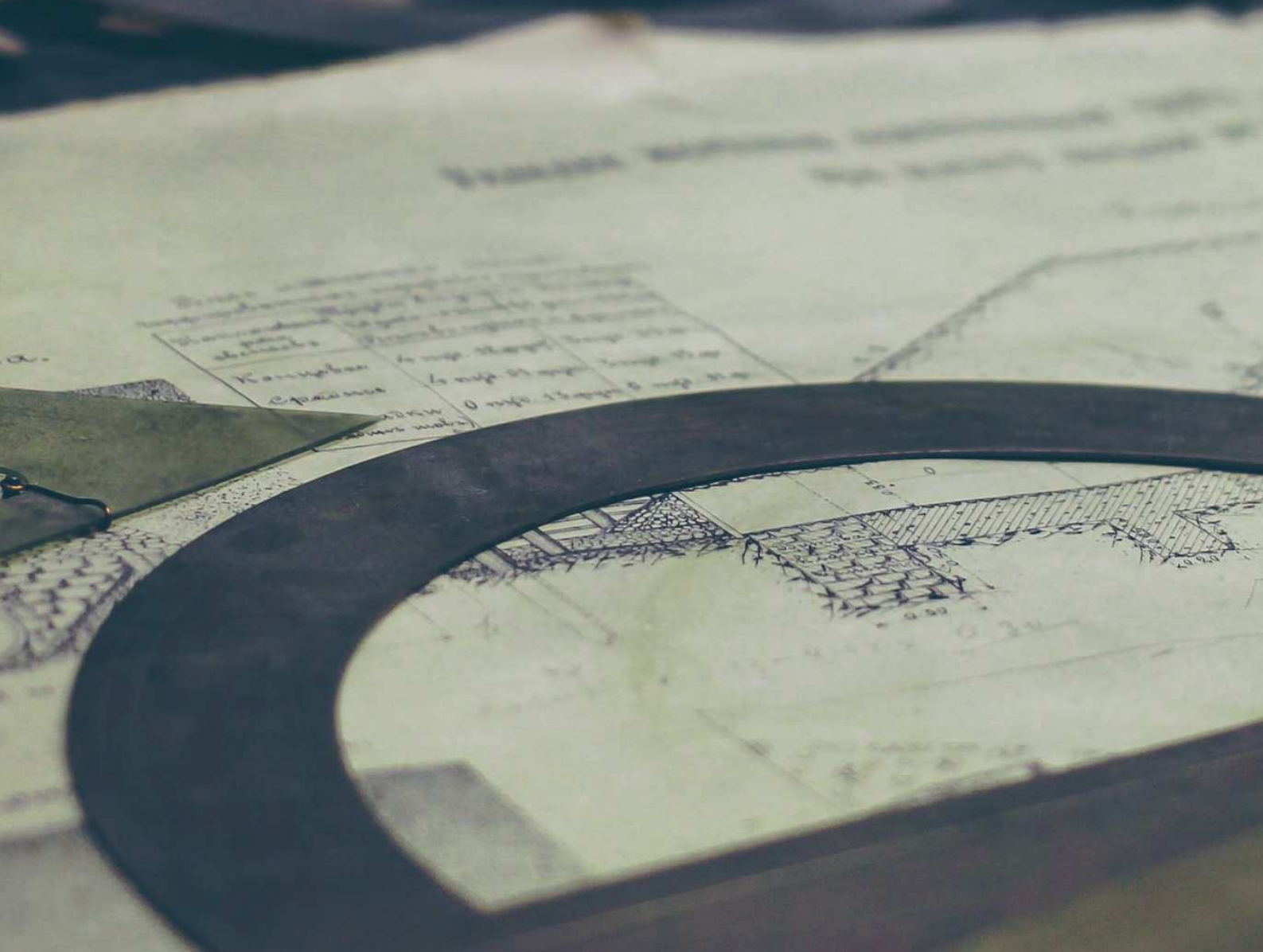


COVET

Continuing Professional Development
in Vocational Education and Training

Basic Angles on Machine Tools

Inspiration for online teaching





In the COVET project, we have collected many great examples of teaching that have been transformed from the classic off-line version into a modern online learning method.

These sample lessons have been created by VET teachers from different EU countries. We present them to you as inspiration for your work.

The lessons are particularly suitable for vocational teachers, but can also serve as a training tool for teachers, trainers and lecturers in other educational settings.

All sample lessons, training materials as well as all information about the project are available at:

<https://www.covet-project.eu/>

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Basic Angles on Machine Tools

1st year of a four-year course with a secondary school leaving exam

Off-line version of the preparation

Goal

Students understand the reasons for making the three basic angles on machine tools. They can describe how these three angles interact, as well as draw a schematic of a cutting blade and correctly name, draw, and label the angles with Greek letters.

Teaching methods

interpretation, problem-based interview, use of three-dimensional aids, drawing schematics, calculation of the basic angles and other activities according to the current situation

Aids

Large turning knife, drill bit- diameter 50mm

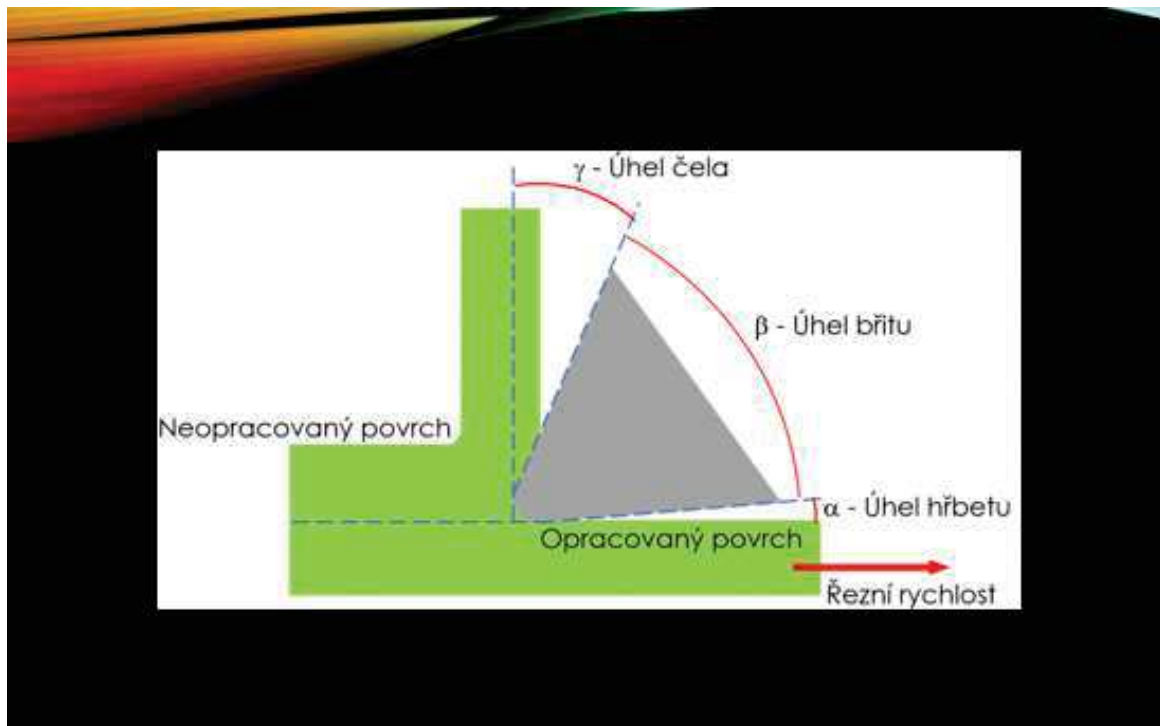
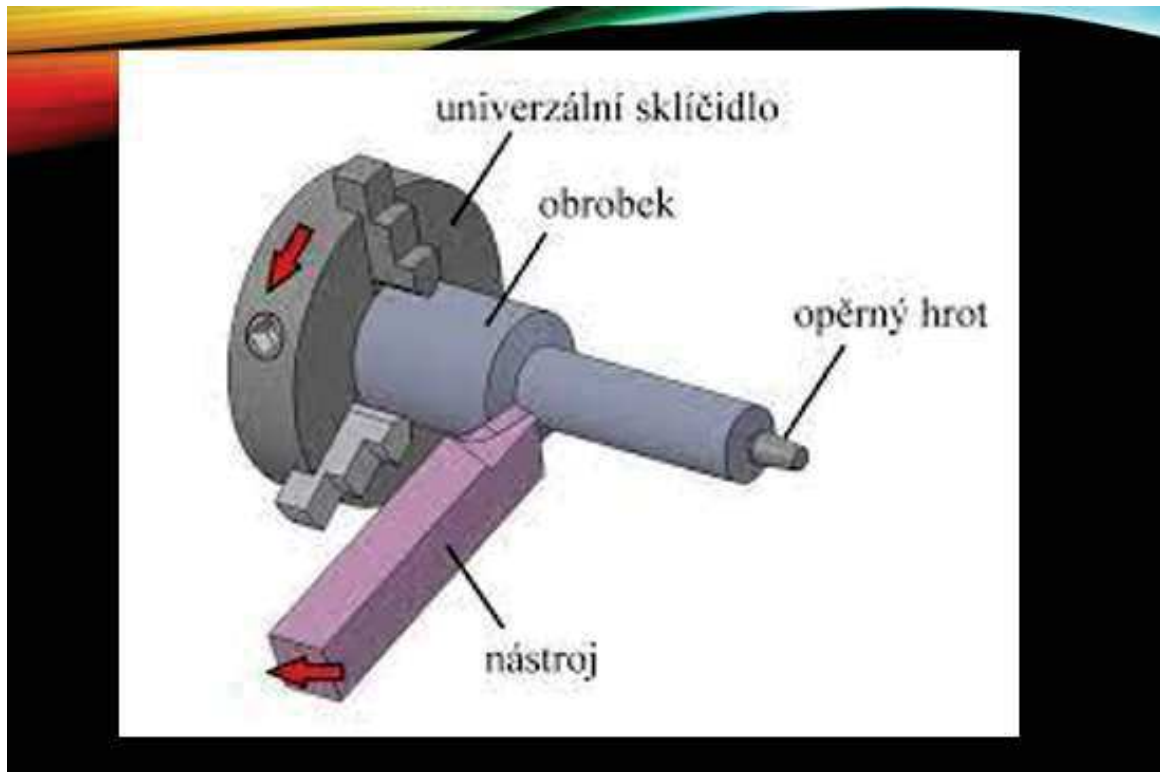
Presentation: terminology, writing and reading necessary Greek letters, angles presented on a saw blade and a turning knife (explanation that we can find angles on all tools)

Worksheets summarizing the topic. They will be given out during the lesson.

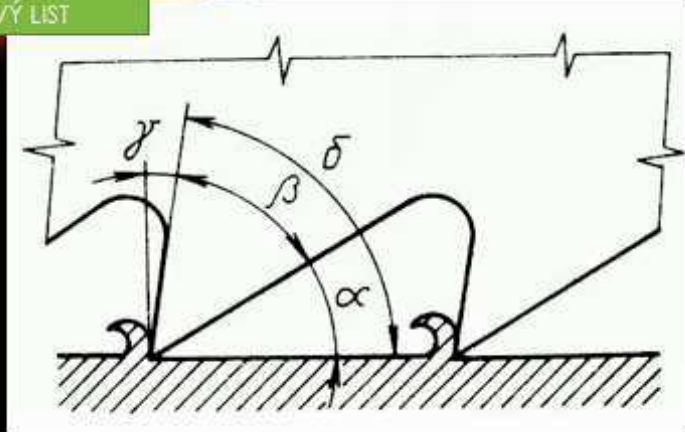
The course of activities during the lesson:

- Revision of terminology - chip, machined surface...
- Reading and writing Greek letters - alpha, beta, gamma, ...
- Revision of angles on the saw blade
- Demonstration of the basic angles on a turning knife inserted into the finder tool
- Demonstration of the angles on a drill
- Interpretation of the negative gamma angle
- Drawing schematics and independently creating a diagram with a negative rake angle
- Distribution of worksheets
- Evaluation of the lesson

Several slides from the PPT presentation



NÁSTROJ –
PILOVÝ LIST

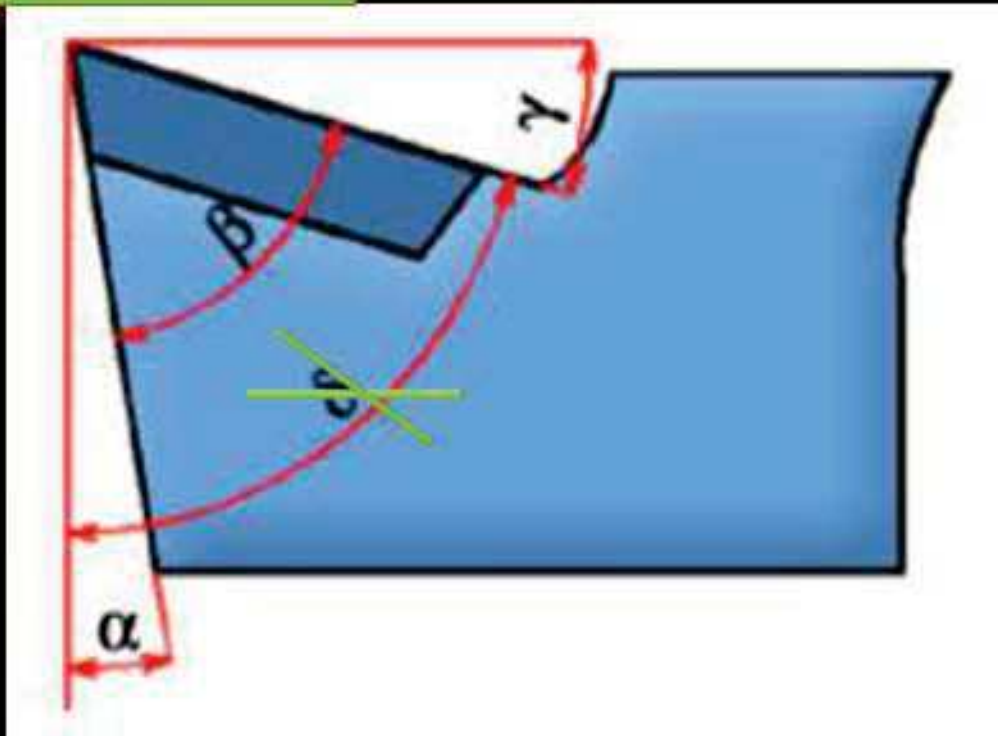


Nástrojové úhly nástroje se volí podle druhu řezaného materiálu a jeho pevnosti –

Úhel α = úhel hřbetu, úhel β = úhel bříty, úhel γ = úhel čela.

Úhel delta je již z normy vypuštěn.

NÁSTROJ –
soustružnický nůž



Online version of the preparation

This unit uses a combination of face-to-face and online teaching.

When teaching, it is very important to get feedback as quickly as possible. It is important for both the students and the teachers.

The teacher needs feedback as quickly as possible so that he or she knows how his or her **chosen method of teaching is working for each type of learner** and can **adapt** the explanation and problem-based conversation **on the spot**, if possible. At the very least, **the teacher needs to understand where the confusion arises in a particular lesson** and possibly improve the situation, either in the teaching texts he gives to the pupils or in the next lesson, when repeating the previous material, in order to clarify as much of the confusion as possible.

It is important for learners **to receive prompt feedback** to make sure that their follow-up builds on the correct understanding of the section of the material. This increases their confidence as they progress through the learning process, and **it is also part of the intrinsic motivation** to maintain attention and keep learning. It is **important not to make a false "footprint" in the brain. Removing it later is difficult; it must be displaced and replaced with the correct knowledge or skills. So the quicker the feedback, the better.**

Feedback can be elicited by the teacher in problem-based interviewing by asking questions that first draw on experiences the teacher assumes the students have.... For example, he/she learns that although passing nine years of elementary school pupils do not know how to label metals in chemistry, and sometimes even oxygen. He must then take this fact into account and first explain where they can obtain such information, and while explaining to pupils he/she should **always say the name of the metal and its chemical mark** and assign the learning for the next lesson, etc.

After this part the questions are based on new information and, for example, on empirical knowledge and logical deductions from their combinations. **However this way the teacher cannot ascertain the level of understanding of the material by the majority of the students even if he tries his best.** Therefore, **it is advisable to ask everyone questions after a certain coherent section and see all the answers.** (This is also a principle of self-paced online courses – dividing the topic into smaller chunks followed by self-assessment tools.) And **this is possible today by preparing a simple feedback test in electronic form to which all students have access. The application in which the test is created must allow the teacher to see the answers of all students immediately.**

After my various experience with online teaching I tend to incorporate online elements even into my ordinary classes. Therefore I decided to **create two quizzes** to test students' understanding of the topic **during the lesson.** As a teacher, I can see my students' answers in the app where I created the quiz. This immediate feedback gives me the opportunity to quickly correct any mistakes or misconceptions that the students may have. The above mentioned topic is very difficult for students.


The quizzes immediately show the students if they answered correctly or not and provide them with instant feedback.

The quizzes were made available to the given class during the given lesson. It is important to have everything well prepared so that you do not face any technical problems.

The course of teaching has therefore changed as follows:

- Revision of terminology - chip, machined surface...
- Reading and writing Greek letters - alpha, beta, gamma...
- Revision of angles on the saw blade
- Demonstration of the basic angles on a turning knife inserted into the finder tool
- Demonstration of the angles on a drill
- **Students take the "Rake, tool and clearance angle - Nomenclature" quiz on their mobile phones and based on their results we discuss the problematic questions and topics**
- Interpretation of the relationship between the size of the basic angles and the negative gamma angle
- **Students take the "Rake, tool and clearance angle – Mutual influence" quiz on their mobile phones and based on their results we discuss the problematic questions and topics**
- Drawing into their notebooks and independently creating a diagram with a negative rake angle
- Distribution of worksheets
- Evaluation of the lesson

Some excerpts from the quiz:

 **1 ZÁKLADNÍ ÚHLY NA NÁSTROJÍCH**

 **1 ÚHEL HŘBETU, ČELA A BŘITU - NÁZVOSLOVÍ**
PROCVIČOVÁNÍ VE VÝUCE

 **2 ÚHEL HŘBETU, BŘITU A ČELA - JAK SE OVLIVŇUJÍ**
procvičování ve výuce

<input type="checkbox"/> Povolit veřejný přístup	Ne
<input type="checkbox"/> Spuštění vyžaduje heslo	
<input type="checkbox"/> Vzhled přehrávače	basic_grey
<input type="checkbox"/> Fórum	skrýt

<input checked="" type="radio"/> Zobrazit správnou odpověď	<input checked="" type="radio"/> Ano <input type="radio"/> Ne
<input type="checkbox"/> Pokračovat po zodpovězení otázky	<input type="checkbox"/> Ano <input checked="" type="radio"/> Ne
<input type="checkbox"/> Umožnit změnu odpovědi	<input checked="" type="radio"/> Ano <input type="radio"/> Ne

<input type="checkbox"/> Složka	----- 1 ZÁKLADNÍ ÚHL
<input type="checkbox"/> Časový limit testu (v minutách)	
<input type="checkbox"/> Bodový limit (body / procenta)	0b
<input type="checkbox"/> Počet pokusů	
<input type="checkbox"/> Zakázat přehrávání ostatních materiálů	<input checked="" type="radio"/> Ano <input type="radio"/> Ne

<input type="checkbox"/> Náhodné pořadí otázek	<input type="radio"/> Ano <input checked="" type="radio"/> Ne
<input type="checkbox"/> Náhodné pořadí odpovědí	<input checked="" type="radio"/> Ano <input type="radio"/> Ne
<input type="checkbox"/> Automatické číslování stránek	<input checked="" type="radio"/> Ano <input type="radio"/> Ne

<input type="checkbox"/> Zobrazit žákovi report	Ano, celkový
<input type="checkbox"/> Zobrazit žákovi výsledek při odevzdání	<input checked="" type="radio"/> Ano <input type="radio"/> Ne
<input type="checkbox"/> Informační stránka	<input checked="" type="radio"/> Ano <input type="radio"/> Ne

1 ÚHEL HŘBETU, ČELA A BŘITU - NÁZVOSLOVÍ

Uživatelské skupiny

Možnosti přístupu

 < 1 / 1 >

Vyberte skupiny pro odebrání přístupu

 MS1A (05.12.2022, 08:00 - 05.12.2022, 12:00)

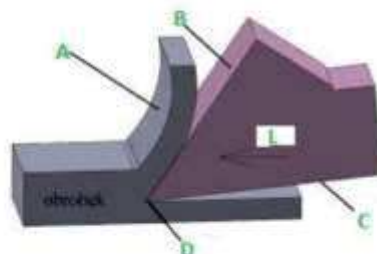
- Otázky <<
1. Proč na obráběcím nástroji vybrušujeme ÚHEL HŘBETU?
 2. Jak ovlivňuje velikost úhlu bříty možnost obrábět různé tvrdé materiály?
 3. ÚHEL ČELA může být
 4. Kladný úhel ČELA umožňuje
 5. ZÁPORNÝ úhel ČELA
 6. Záporný úhel čela gama musíme na nástroji vytvořit,
- Konec testu

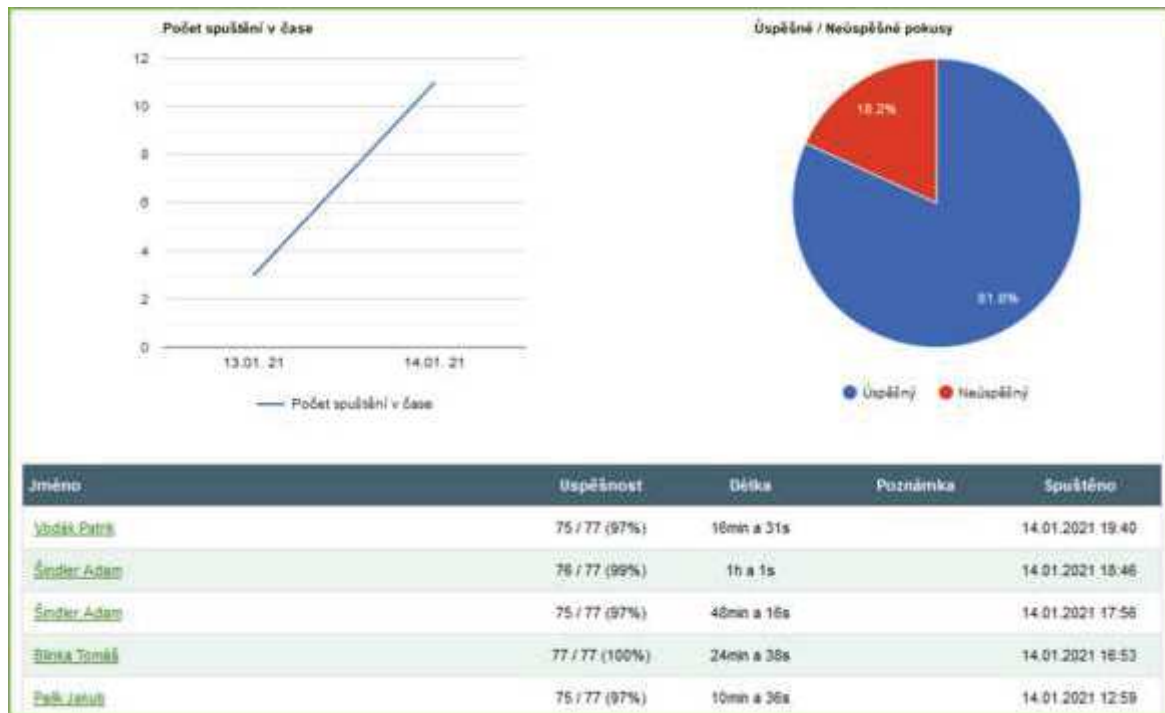
Záporný úhel čela gama musíme na nástroji vytvořit,

- pokud potřebujeme velký úhel bříty pro obrábění tvrdých materiálů
- pokud potřebujeme malý úhel bříty pro obrábění měkkých materiálů.
- pokud potřebujeme malý úhel bříty pro obrábění tvrdých materiálů.

- Otázky <<
1. Kliknutím na příslušné PÍSMENO označte HŘBET NÁSTROJE
 2. Kliknutím na příslušné PÍSMENO označte ČELO NÁSTROJE (dodržte po něm tlásku)
 3. Kliknutím na příslušné PÍSMENO označte břítem počezávanou třísku
 4. Kliknutím na příslušné PÍSMENO označte OSTRÍ NÁSTROJE
 5. Jakým řeckým písmenem nejčastěji označujeme úhel hřbetu?

Kliknutím na příslušné PÍSMENO označte HŘBET NÁSTROJE





Feedback on the lesson

The teacher can see percentual success or failure of the entire class as well as answers of specific students. These types of online tests prove to be a very powerful help for the teacher as it provides immediate feedback and offers extra features, such as counting of success percentage etc. Seeing all different types of information enables the teacher to improve his work with the entire class as well as individually.

Also the students seem to be happy about this chunking of the lesson and obtaining immediate feedback on their understanding of the given topic.



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