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## HIGH FEED MILLING OF PRETREATED TOOL STEEL 55NiCrMoV7

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**Abstract:** When milling the vertical walls, shoulder milling is generally necessary. In the case of deep walls, using a long-edge cutter tends to vibrate. In addition to the low machining speeds, the machining accuracy is negatively affected. The main objective of this work is to experimentally analyze the machining of vertical walls in the case of pretreated tool steel 55 NiCrMoV7 using a high-feed milling cutter with indexable inserts. The experimental analysis aims to study the influence of cutting conditions (cutting speed, axial and radial cutting depths, feed per tooth) on tool life (cutting tool wear) in the case of machining vertical walls. Based on the resulting experimental data, the conclusion is that cutting speed has a predominant direct influence on tool life, not being influenced by variations in feed rate or feed per tooth.

**Key words:** shoulder milling, cutting parameters, high-feed milling, surface roughness, pre-treated steel.

### 1. INTRODUCTION

One of the main concerns of the machining industry is to reduce machining costs, among others, by reducing machining time using new cutting technologies that allow for increased cutting parameters [1].

To increase productivity in the milling process, one possibility is high-feed milling. This is a cutting method that uses high feed rates per tooth and works with shallow depths of cut. These characteristics allow for high material removal rates and, as stated at the beginning, increase productivity. This type of machining is particularly effective for roughing and semi-finishing operations, helping the machinist to greatly reduce roughing time.

According to a producer of cutting tools, the machining time saved with the high feed technique is up to 3 times that of classic machining [2].

In recent years, cutting tools have been developed that can also perform finishing operations with very good results, exemplified in the following lines.

Face milling with the high-feed milling method can be used for pre-machining operations, ensuring high precision for further machining or for final finishing. In most

applications, very narrow tolerances are achieved.

In copy milling, high-feed milling can be used to mill complex surfaces, which is very useful when milling molds and dies.

When machining large holes where pre-drilling or multiple step operations are required, high feed milling using helical interpolation can be used very effectively.

The advantage of high-feed milling is the use of a small rake angle (less than 20 degrees). This almost flat rake angle produces thin and wide chips, which leads to a significant reduction in radial forces, with cutting forces being directed towards the machine spindle in the axial direction, resulting in greater stability and reduced vibration, extending tool life [3], [4].

High-feed milling is also constantly used to process difficult materials, such as titanium and other light alloys.

Manufacturing vertical-walled parts by high-feed milling offers superior efficiency and surface quality.

The experimental analysis presented in this paper presents the machining of vertical walls using dedicated high-feed milling cutters with indexable inserts. The experiment involved milling operations with different axial and radial depths of cut, as well as changes in cutting speed and feed per tooth.

The material that was chosen is a new type of pretreated steel used in the mold industry, namely 55NiCrMoV7. The peculiarity of this material is its hardness, which varies between 40-45 HRC units.

## 2. LITERATURE REVIEW

A first approach to increasing cutting parameters is to increase the cross-section of the milling layer, which directly implies increasing cutting forces and the properties of the finished product.

Knowledge of the forces that occur during high-speed cutting leads to an understanding of dimensional deviations and the condition of the machined surface. This allows the causes of unstable processes during part execution to be identified and resolved, forming the basis for improving milling conditions [5], [6].

Cutting strategies for high-feed machining are influenced by the rigidity of the milling machine and the machining conditions imposed on the workpieces to be machined. Due to the evolution of measuring equipment, the forces in the process can now be measured throughout the milling cutting process.

On the one hand, the influence of cutting parameters on the cutting force resulting from milling hard steels in dry environments or with cooling, both with emulsion and with air, was studied. Sirin et al. analyzed the cutting temperature, tool wear, surface integrity, and tribological properties in sustainable milling of Ti6Al4V alloy: LN2 nanofluid and hybrid machining [7]. The conclusions of their analysis were that hybrid methods, especially the use of LN2 + CuO-doped nanofluid, outperformed individual LN2 and nanofluid applications, as well as dry milling, in terms of overall machining.

According to the analysis of Cui et al. [8] regarding the milling of steels with a hardness of 47 HRC, at a cutting speed of 200 m/min, minimal cutting forces result, and they increase substantially at speeds above 1400 m/min.

After researching the scientific works studied, it is obvious that the wear of cutting tools in high feed milling is directly influenced by the cutting forces and temperatures that are generated in the cutting process [9]. In addition

to these two major impact factors, we must also consider the chip formation method and the radial engagement of the cutting tool in the material (radial engagement) [10].

Another major factor that leads to cutting tool wear is the level of vibration that occurs in the spindle of a CNC milling machine. This phenomenon also occurs when one of the indexable insert's breaks, because of a vibration peak and is followed by an increase in the overall vibration level due to the imbalance that occurs with cutting edges [10].

A similar analysis was also performed by Toh [11]. He analyzed the influence of cutter path orientations used in roughing and finishing milling on vibrations using Fast Fourier Transform (FFT) analysis of cutting force effects using two cutting tool condition factors: new and worn cutters. The results showed that using large axial depths of cut (between 10 and 20 mm) in the case of up and down milling generated minimal vibration effects.

Aramesh [12] studied how to improve cutting tool life by reducing chipping and improving the machining time of Inconel 718, also a difficult milling steel. He proposes a new way of treating milling tools to improve tool wear and reduce chipping during the machining of Inconel 718 material. The surface treatment involves initial machining on an aluminum-silicon (Al-Si) workpiece (less than 2 seconds) before the actual machining of the Inconel. Through this initial machining process, a very thin layer of Al-Si is deposited on the tool face.

There are also several research studies on the mechanism of high-speed milling, such as those carried out by Zang [13], Perez [14] or Chang [15]. Each of them experimentally investigated the high-feed milling process on different materials and the effects that occur within the process, as well as on the processed materials.

In view of the above, it was considered necessary to analyze the cutting parameters in relation to tool wear and dimensional deviation in the case of hard steels using the high feed technique.

This study presents the results of theoretical and experimental research on the high-feed shoulder milling process of hard steel, 55NiCrMoV7, frequently used in the construction of injection molds.

### 3. MATERIALS AND METHOD

#### 3.1 Workpiece and material used

In this experimental study, rectangular blocks with dimensions of 60x50x85 mm of pretreated 55NiCrMoV7 steel were used for milling, requiring a larger surface area for milling the vertical walls, as a requirement from the point of view of the precision of the experiment performed (Figure 1).

55NiCrMoV7 is a pre-hardened tool steel, also known as 1.2714 HH, and is used due to its good toughness and strength. Steels show high machinability, good dimensional stability, wear resistance, and thermal conductivity. It is most widely used in the field of plastic injection molds, especially for active areas or moving elements such as cores, slides, and cavity inserts. It is characterized by good machinability, weldability, and polishing.

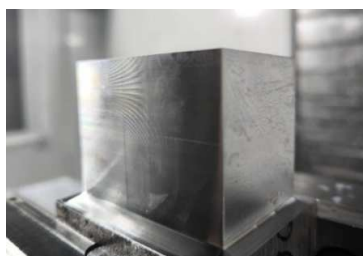


Fig. 1. The workpiece

Tables 1 and 2 present an analysis of the important characteristics of this material, as well as recommendations from the steel manufacturers. The chemical composition (%) of 55NiCrMoV7 pretreated steel used in experimental method can be seen in Table 1.

Table 1

Material equivalence according to standards

C	Cr	Mo	Ni	V
0,56	1,10	0,50	1,70	0,10

Table 2 shows the values of the hardness and thermal conductivity characteristics. Hardness can vary between 40 and 47 HRC units, depending on the material supplier.

Table 2

Strength and thermal conductivity

Strength	41 - 45 HRC	( $\approx$ 1300 - 1450 N/mm <sup>2</sup> )
Thermal conductivity at 100 °C	35 W/m K	

#### 3.2 Considerations regarding the milling machine and cutting tools

The workpiece steel was clamped very rigidly on the CNC vertical machining center with a precision vice, at a height of 20 mm. The milling experiments were performed on a HAAS VF-2YT-EU 3-axis CNC milling center, shown in Figure 2. The main characteristics of the equipment are maximum spindle rotation of 10000 [rpm] and a maximum power of 22.4 kW, and a maximum torque of 122 N·m at 2000 rpm.



Fig. 2. The milling machining center

In the milling experiments, a Walter M4132 shoulder milling cutter, grade M4132-025-TC12-02-09, equipped with 2 four-edge inserts, namely SDMX0904ZDR-E27 WSP45G, was used. The tool's milling diameter is  $D_c=25$  mm, and the indexable inserts have a positive square.

The main characteristics of the indexable insert can be seen in Table 3.

Table 3

Indexable insert – characteristics

Symbol	Description	Value
a	Clearance angle major	15°
b	Wiper cutting edge length	0.8 mm
r	Radius	1 mm

The Walter SK40-M12-69 L=49.9 (DIN69871 AD/B) holder was used to mount the cutting tools on the milling machine (Figure 3).



Fig. 3. The shoulder milling cutter

The cutting tool chosen is a special shoulder milling tool (vertical wall milling) and is used with positive angle cutting inserts. This tool and inserts have been developed for milling operations at high milling speeds and high feeds. High feed milling (HFM), also known as high efficiency milling (HEM), is characterized by using shallow depths of cut and high feed rates per tooth to achieve faster material removal rates compared to other milling techniques. This technique is recommended for roughing large parts and machining hard materials such as superalloys. Very high efficiency is achieved in these cases.

In comparison with conventional milling, which generates thick chips when removing material, high feed milling produces thin, easily ejected chips due to the “chip thinning” effect and a low cutting tool lead angle. Some of the chips resulting from the milling process can be seen in Figure 4.



Fig. 4. The chips resulting from milling

### 3.4 Method used in the experiment

Starting from the manufacturer's recommendations versus the reality of mechanical processing operations, where most of the time the working conditions are different (short delivery times, non-conforming semi-finished product dimensions, less powerful machining centers, low rigidity of the machines), the experiment was intended to be an analysis of the insert wear (lifetime) in working conditions with cutting speeds higher than those recommended by the manufacturer and of the machining accuracy obtained under the given conditions. The input parameters were axial depth of cut ( $a_p$ ), radial depth of cut ( $a_e$ ), feed per tooth ( $f_z$ ), cutting speed ( $V_c$ ) and tool engagement ratio ( $a_e/D_c$ ). The parameters

monitored were the machining time obtained with a series of inserts (insert lifetime) and the dimensional stability of the parts obtained.

Even though this cutting tool time is for the roughing operation, the dimensional deviation was tracked because it is one of the influencing factors of the subsequent operation, namely the finishing operation.

As an experimental condition for each set of parameters, the inserts were indexed using a new cutting edge. Another condition was that the 40 mm distance between the axes was kept constant in all experiments. In this way, problems related to excessive runouts in the toolholder during the milling process were avoided.

The experimental plan consisted of milling steel blocks (Figure 5 and Figure 6) with the following input parameters modified:

- axial depth of cut,  $a_p$ : 0.1 and 0.15 [mm];
- radial cutting depth,  $a_e$ : 1.25 and 2.5 [mm], corresponding to a tool engagement ratio  $a_e/D_c$ : 1/20 and 1/10;
- feed per tooth,  $f_z$ : 0.2, 0.25, and 0.3 [mm].

Figure 5 shows the sequence of the high feed shoulder milling of pretreated 55NiCrMoV7, using a very abundant cooling.



Fig. 5. Steel blocks during the milling operation

Figure 6 shows the milled parts from this experiment.

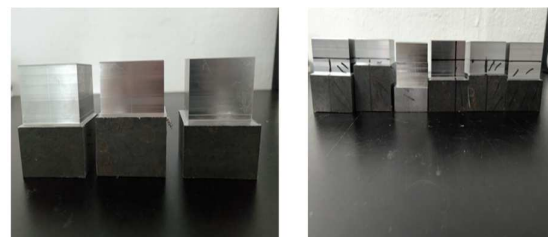


Fig. 6. Milling of steel blocks 55NiCrMoV7

#### 4. RESULTS AND INTERPRETATIONS

For this study, based on the input parameters (axial and radial depth of cut, feed per tooth, tool engagement ratio, and cutting speed), the insert wear (tool-life) was evaluated.

The results obtained from this experiment are presented in Tables 4, 5, 6 and 7 with the following observations: in some cases, a value was marked with 0 because machining with the entered cutting parameters was impossible (occurrence of very high vibrations).

In the case of insert wear, the end point of life was considered the moment when the tip of the insert broke. Following the visual analysis of the insert wear, 5 types of wear (Figure 7) were identified:

- Flank wear, the most common form of wear, appears as a ground area on the insert clearance surface, just below the cutting edge;
- Crater wear appears on the seating (top) surface of the insert, behind the cutting edge, in the form of a depression. It is caused by high temperature and chemical reactions between the chips and the insert material.
- Plastic deformation occurs when the insert becomes soft due to excessive heat and deforms under the pressure of cutting forces.
- Chipping/Micro-chipping, these are small tears of material on many cutters, often caused by vibrations, mechanical shocks, or include pain in the processed material.
- Edge Rounding, the sharp edge can become dull or wear out evenly, reducing cutting efficiency.

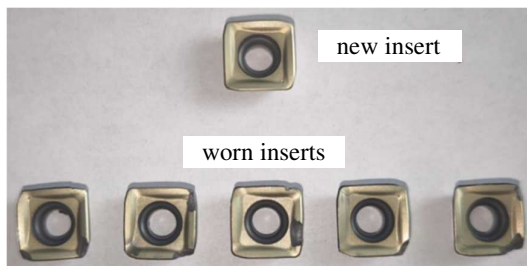


Fig. 7. Tool inserts wear

The relationship between tool life (T) and feed per tooth (fz) is described by a variation of Taylor's equation, which also includes other cutting parameters. In our case, a simplified formula is:

$$V_c \cdot T^n \cdot fz^y \cdot ap^x \cdot ae^z = C, \quad (1)$$

where:

- T = tool life (min)
- fz = feed per tooth (mm)
- Vc = cutting speed (m/min)
- ap = axial depth of cut (mm)
- ae = radial depth of cut (mm)
- n, y, x, z, and C are experimentally determined constants.

This study aimed to evaluate the influence of different cutting parameters on tool life, based on 12 milling experiments. The values obtained in the first set of experiments are presented in Tables 4 and 5.

The input data for this first set are presented below:

**Set 1: Axial depth of cut (ap) = 0.1 mm**

**Case A: Radial depth of cut (ae) = 2.5 mm**

This set of experiments shows the significant impact of cutting speed (Vc) and feed per tooth (fz) on tool life (Table 4).

Table 4

**The Influence of Cutting Parameters on Tool Life  
Set 1, Case A: ap=0.1 mm and ae=2.5 mm**

Exp. no.	Feed per tooth fz [mm]	Cutting speed Vc [m/min]	Tool life theoretical T [min]	Tool life real-time Tr [min]
1	0.2	100	180	170
	0.25		115	100
	0.3		80	70
2	0.2	150	22.5	20
	0.25		14.5	5
	0.3		10	0
3	0.2	170	35.5	22
	0.25		22.75	15
	0.3		15.8	0

Experiment 1 (Vc=100 m/min): The tool life is the longest here, varying from 180 to 80 minutes as the feed increases. This is the most efficient scenario for tool-life.

Experiment 2 (Vc=150 m/min): Increasing the cutting speed drastically reduces the tool life from 22.5 to 10 minutes. The tool wears much faster, even with a small change in feed.

Experiment 3 ( $V_c=170$  m/min): This scenario shows the highest stress on the tool. The tool life drops from just 15.8 to 4.5 minutes, highlighting the critical trade-off between productivity and tool durability at high speeds.

**Case B:** Radial depth of cut ( $a_e$ ) = 1.25 mm

By reducing radial engagement (Table 5), tool life is significantly improved across the board compared to Case A.

Table 5

**The Influence of Cutting Parameters on Tool Life**  
Set 1, Case B:  $a_p=0.1$  mm and  $a_e=1.25$  mm

Exp. no.	Feed per tooth $f_z$ [mm]	Cutting speed $V_c$ [m/min]	Tool life theoretical $T$ [min]	Tool life real-time $T_r$ [min]
4	0.2	100	360	320
	0.25		230.5	200
	0.3		160	110
5	0.2	150	102.4	100
	0.25		65.5	60
	0.3		45.5	30
6	0.2	170	71.1	50
	0.25		45.5	25
	0.3		31.6	10

Experiment 4 ( $V_c=100$  m/min): Reducing  $a_e$  from 2.5 to 1.25 mm doubles the theoretical tool life to 360 minutes. This allows for high productivity with excellent tool durability.

Experiment 5 ( $V_c=150$  m/min): Even at a high cutting speed, the reduced radial engagement provides a respectable tool life of 102.4 to 45.5 minutes.

Experiment 6 ( $V_c=170$  m/min): The tool life remains relatively stable, ranging from 71.1 to 31.6 minutes. While shorter, this is still a viable option for high-speed machining.

**Set 2: Axial depth of cut ( $a_p$ ) = 0.15 mm**

The values obtained in the first set of experiments are presented in Tables 6 and 7. The input data for this first set are presented below:

**Case A:** Radial depth of cut ( $a_e$ ) = 2.5 mm

Experiment 7 ( $V_c=100$  m/min): Tool life is now shorter, starting at 120 minutes for the lowest feed, confirming the negative impact of a larger axial depth of cut (Table 6).

Experiment 8 ( $V_c=150$  m/min): Tool life drops to a very low range, from 15 to 6.7 minutes.

Experiment 9 ( $V_c=170$  m/min): The tool life is extremely short, ranging from 10.2 to 4.5 minutes, which would not be a practical cutting condition.

**Case B:** Radial depth of cut ( $a_e$ ) = 1.25 mm

Even with the higher axial depth of cut, reducing the radial engagement still significantly improves tool life (Table 7).

Experiment 10 ( $V_c=100$  m/min): Tool life is improved to 240 to 106.7 minutes, showcasing the beneficial effect of a smaller  $a_e$ .

Experiment 11 ( $V_c=150$  m/min): Tool life ranges from 48 to 21.3 minutes, providing a more balanced result than Experiment 8.

Experiment 12 ( $V_c=170$  m/min): The tool life ranges from 32 to 14.2 minutes.

Table 6

**The Influence of Cutting Parameters on Tool Life**  
Set 2, Case A:  $a_p=0.15$  mm and  $a_e=2.5$  mm

Exp. no.	Feed per tooth $f_z$ [mm]	Cutting speed $V_c$ [m/min]	Tool life theoretical $T$ [min]	Tool life real-time $T_r$ [min]
7	0.2	100	120	100
	0.25		76.8	50
	0.3		53.3	25
8	0.2	150	15	0
	0.25		9.6	0
	0.3		6.7	0
9	0.2	170	10.2	0
	0.25		6.5	0
	0.3		4.5	0

Table 7

**The Influence of Cutting Parameters on Tool Life**  
Set 2, Case B:  $a_p=0.15$  mm and  $a_e=1.25$  mm

Exp. no.	Feed per tooth $f_z$ [mm]	Cutting speed $V_c$ [m/min]	Tool life theoretical $T$ [min]	Tool life real-time $T_r$ [min]
10	0.2	100	240	220
	0.25		153.6	150
	0.3		106.7	100
11	0.2	150	48	30.5
	0.25		30.7	18
	0.3		21.3	10
12	0.2	170	32	10
	0.25		20.5	3
	0.3		14.2	0

The graphs from Figure 8 and 9 clearly show that reducing the radial depth of cut ( $a_e$ ) has a powerful effect on increasing tool life. Even at higher cutting speeds, the tool lasts much longer when the radial depth of cut ( $a_e$ ) is smaller. This demonstrates a key strategy for optimizing machining processes: reducing  $a_e$  can help you achieve higher cutting speeds without as much of a penalty to tool durability.

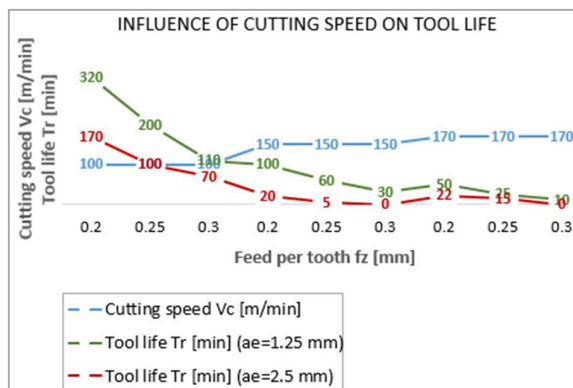


Fig. 8. The influence of cutting speed on tool life, Axial depth of cut  $a_p = 0.1$  mm

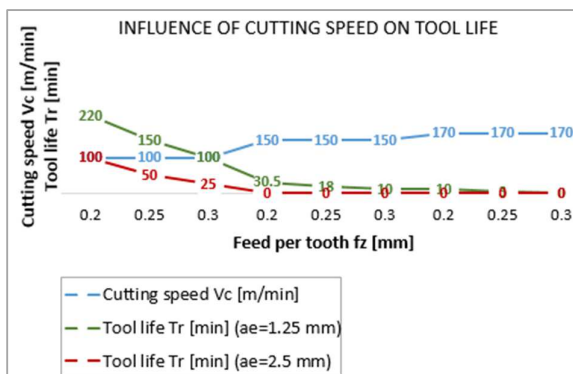


Fig. 9. The influence of cutting speed on tool life, Axial depth of cut  $a_p = 0.15$  mm

## 5. CONCLUSION

The first conclusion is that cutting speed ( $V_c$ ) is the critical factor. The data shows that cutting speed ( $V_c$ ) has the most significant impact on tool life. Increasing cutting speed drastically reduces tool life.

For example, at  $V_c=100$  m/min, the average tool life was over 100 minutes, but at  $V_c=170$  m/min, it dropped to just over 15 minutes, with many cases of immediate tool failure.

In addition to cutting speed, axial depth of cut and radial depth of cut have a significant impact. Both axial depth of cut ( $a_p$ ) and radial depth of cut ( $a_e$ ) have a direct and negative effect on tool life, although their influence is secondary to cutting speed. Increasing the radial depth of cut from 1.25 mm to 2.5 mm reduced tool life by approximately 32% (comparing Experiments 4 and 1). Similarly, increasing the axial depth of cut ( $a_p$ ) from 0.1 mm to 0.15 mm caused a decrease in tool life by approximately 43% (comparing Experiments 1 and 7).

Another important point is that the theoretical model consistently overestimated the real-time tool life, especially at higher cutting speeds. At 150 m/min and 170 m/min, the real-time tool life was often zero or close to zero, while the theoretical model still predicted positive values. This indicates that the model does not fully consider the rapid tool wear under high stress conditions (the occurrence of vibrations or the power of the main spindle motor).

When machining pretreated 1.2714 HH steel, a balance between productivity and tool life is essential. To maximize tool life, it is recommended to use the lowest possible cutting speed that meets the production requirements. If a higher cutting speed is required for productivity, you should reduce the axial and radial depth of cut ( $a_p$  and  $a_e$ ) to increase tool life.

## 6. REFERENCES

- [1] Kurpiel, S., Cudok, B., Zagórski, Cieslik, J., Skrzpkowski, W.B., *Influence of tools and cutting strategy on milling conditions and quality of horizontal thin-wall structures of titanium alloy Ti6Al4V*, *Sensors*, 18;23(24):9905, Basel, 2023.
- [2] Seco, *High Feed Mills*, <https://www.secotools.com/article/614>
- [3] Seco, *8 Advantages of High Feed Milling with Indexable Inserts*, <https://www.secotools.com/article/147327>
- [4] ISCAR, *Practical Guide for High Feed Milling with Indexable Inserts*, [https://www.iscar.de/Catalogs/Publication/germany\\_7](https://www.iscar.de/Catalogs/Publication/germany_7)

- [5] Tran, M.Q., Liu, M.K., *Chatter Identification in End Milling Process Based on Cutting Force Signal Processing*, IOP Conference Series: Materials Science and Engineering, 654, 012001, 2019.
- [6] Yang, M., Mao, X., Peng, Y., Li, B., Jiang, X., Li, L., *Trajectory Dependent Structural Vibration and Its Effects on Surface Generation*, IOP Conference Series: Materials Science and Engineering, 491, 012009, 2019.
- [7] Sirin, E., Yildirim, G.V., Şirin, S., Kivak T., Sarikaya, M., *Comprehensive analysis of cutting temperature, tool wear, surface integrity and tribological properties in sustainable milling of Ti6Al4V alloy: LN nanofluid and hybrid machining*, Journal of Manufacturing Processes, 131 pp. 1360–1371, 2024.
- [8] Cui, X.B., Guo, J.X., Wang, X.Y., *Cutting Force in High-Speed Face Milling AISI H13 Steel*, Key Engineering Materials, vol. 667 IRP Annals, Volume 68, pp 843–866, 2019.
- [9] Cui, X., Guo, J., Zhao, J., Yan, Y., *Chip temperature and its effects on chip morphology, cutting forces, and surface roughness in high-speed face milling of hardened steel*, International Journal of Advanced Manufacturing Technology, 77, 2209–2219, 2015.
- [10] Silva, F.J.G., Martinho, R.P., Magalhaes, L., Fernandes, F., and others, *A Comparative Study of Different Milling Strategies on Productivity, Tool Wear, Surface Roughness, and Vibration*, Journal of Manufacturing and Materials Processing, 8, 115, 2024.
- [11] Toh, C.K., *Vibration analysis in high speed rough and finish milling hardened steel*, Journal of Sound and Vibration Volume 278, Issues 1–2, pp 101-115, 2004.
- [12] Aramesh, M., Montazeri, S., Veldhuis, S.C., *A novel treatment for cutting tools for reducing the chipping and improving tool life during machining of Inconel 718*, Elsevier, Volumes 414–415, pp 79-88, 2018.
- [13] Ping, Z., Yue, X., Shuangfeng, H., Ailing, S., Baoshun, L., Xiao, Y., *Experiment and simulation on the high-speed milling mechanism of aluminum alloy 7050-T7451*, Vacuum 182, 109778, 2020.
- [14] Perez, I., Madariaga, A., Cuesta, M., Garay, A., Arrazola, P.J., Ruiz, J.J., Rubio, F.J., Sanchez, R., *Effect of cutting speed on the surface integrity of face milled 7050-T7451 aluminium workpieces*, Procedia CIRP, volume 71, pp. 460–465, 2018.
- [15] Chang, H., Li, L., Shi, R., *Design and manufacturing technology of high-speed milling cutter for aluminum alloy*. Procedia Engineering, volume 174, pp. 630-637, 2017.

### **Frezarea cu avans mare a oțelului de scule pretrat 55NiCrMoV7**

La frezarea pereților verticali, frezarea periferică este în general necesară. În cazul pereților adânci, utilizarea unei freze cu muchie lungă tinde să vibreze. Pe lângă vitezele mici de prelucrare, precizia de prelucrare este afectată negativ. Obiectivul principal al acestei lucrări este de a analiza experimental prelucrarea pereților verticali în cazul oțelului pretrat 55NiCrMoV7 utilizând o freză cu avans mare și plăcuțe amovibile. Analiza experimentală își propune să studieze influența condițiilor de aşchiere (viteza de aşchiere, adâncimile de aşchiere axiale și radiale, avansul pe dinte) asupra duratei de viață a sculei (uzura sculei aşchietoare) în cazul prelucrării pereților verticali. Pe baza datelor experimentale rezultate, concluzia este că viteza de aşchiere are o influență directă predominantă asupra duratei de viață a sculei, nefiind influențată de variațiile vitezei de avans sau ale avansului pe dinte.

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