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Comparison of Carbide and HSS Cutting Tool Performance in Turning of Stainless Steel (AISI 304): A Literature Review

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Abstract

Carbide and High-Speed Steel (HSS) cutting tools are the two most commonly used tool materials in turning processes; however, a systematic comparison of their performance on difficult-to-machine materials such as AISI 304 austenitic stainless steel remains limited. AISI 304 exhibits low thermal conductivity, a strong work hardening tendency, and high affinity between the workpiece and tool, which accelerates tool wear and degrades surface quality. This systematic literature review follows PRISMA guidelines and analyzes studies from 2013–2025 retrieved from Scopus, ScienceDirect, MDPI, and ResearchGate databases. Performance comparison was conducted based on four primary parameters: tool life, surface roughness (Ra), cutting force (Fc), and cutting temperature, under dry, flood cooling, and minimum quantity lubrication (MQL) conditions. The review findings indicate that coated carbide tools consistently outperform HSS tools across all parameters, particularly at medium-to-high cutting speed ranges, owing to their superior thermal resistance and ability to suppress built-up edge formation. NF-MQL and internally cooled tool (ICT) cooling strategies proved to be the most effective in reducing tool wear while simultaneously improving surface quality compared to conventional flood cooling. HSS tools remain economically relevant for low-speed and intermittent cutting in small-scale production settings. Identified research gaps include the scarcity of standardized direct comparisons, the underexplored potential of micro-textures on modern HSS tools, and the absence of a universal predictive model for tool selection on difficult-to-cut materials.

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INTRODUCTION

The Austenitic stainless steel AISI 304 is a widely used engineering material across the chemical processing, food and beverage, biomedical, and automotive industries owing to its superior corrosion resistance, mechanical strength, and biocompatibility (França et al., 2024)(Singh et al., 2018). Nevertheless, AISI 304 is widely recognized as a difficult-to-cut material, attributed to three defining characteristics: an intensive work hardening tendency during cutting, low thermal conductivity (approximately 16 W/m·K), and a high affinity between the workpiece and the cutting tool (Binali et al., 2023). These characteristics cause heat to concentrate at the tool–chip interface, accelerating tool wear in various forms, including flank wear, crater wear, and built-up edge (BUE) formation, while simultaneously degrading surface quality and dimensional accuracy of the finished component (Chinchanikar & Gadge, 2023).

The selection of cutting tool material represents a critical decision that directly influences tool life, surface quality, cutting force, and overall process efficiency. High-speed steel (HSS) tools offer high toughness and low cost; however, they are susceptible to thermal softening above 600°C and are prone to catastrophic failure at cutting speeds exceeding 45 m/min (Aboloje et al., 2024)(Trent & Wright, 2000). In contrast, coated carbide tools such as TiAlN and AlTiN variants exhibit microhardness values of up to 34

GPa with superior thermal and oxidation resistance, enabling operation at higher cutting speeds while sustaining longer tool life (Moganapriya et al., 2022).

Several studies have independently investigated the performance of each tool type, encompassing the effects of tool coatings (Sharma & Gupta, 2019), minimum quantity lubrication (MQL) conditions (Sivaiah et al., 2021), and the influence of cutting parameters on tool life (Bouzid et al., 2018). However, no review has systematically compared both tool types simultaneously based on multi-performance parameters in the specific context of AISI 304 machining (Aboloje et al., 2024)(Binali et al., 2023). This knowledge gap constitutes a significant barrier for researchers and industrial practitioners seeking evidence-based tool selection decisions.

This article presents a systematic literature review comparing the performance of carbide and HSS tools in the turning of AISI 304 stainless steel, evaluated across four principal parameters: tool life, surface roughness (Ra), cutting force, and cutting temperature. The influence of cutting conditions, namely dry cutting, flood cooling, and minimum quantity lubrication (MQL), is also examined, with the dual objective of providing tool selection recommendations and identifying research gaps for researchers and practitioners in precision machining.

This study employed a Systematic Literature Review (SLR) method based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) to identify, evaluate, and synthesize the literature regarding the comparison of the performance of carbide and High Speed Steel (HSS) tools in the turning process of AISI 304 stainless steel (Gawde et al., 2023).

A. Literature Search Strategy

A literature search was conducted via Scopus, ScienceDirect, MDPI, and ResearchGate using a combination of keywords with the Boolean operators AND/OR, including: "turning AISI 304," "carbide tool for stainless steel," "HSS turning 304," "tool wear AISI 304," "surface roughness in stainless steel turning," and "cutting force AISI 304". The search was limited to publications from 2013–2025 to ensure relevance to the latest developments in cutting tool technology (Aboloje et al., 2024)(Septi et al., 2024). Duplicate articles were eliminated based on similarities in title, author, and DOI before entering the screening stage.

B. Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were established to ensure the relevance and validity of the analyzed literature (Gawde et al., 2023), as shown in Table 1.

RESEARCH METHODS

Table 1. Inclusion and Exclusion Criteria for the Literature

Criteria	Inclusion	Exclusion
Publication type	Scopus-indexed international journal articles	Blogs, opinion pieces, non-scientific repositories, and non-peer-reviewed publications
Material	AISI 304 stainless steel	Stainless steel other than AISI 304
Machining rocesses	Turning	Milling, drilling, grinding, EDM
Tool type	Carbide and HSS tools	Ceramic, CBN, and PCD tools without mention of carbide or HSS
Research parameters	Tool life, surface roughness (Ra), cutting force (Fc), cutting temperature	Articles without cutting performance parameters
Publication year	2013-2025	Outside this timeframe

C. Literature Selection Process

The literature selection process followed the PRISMA flowchart, which consists of the identification, screening, eligibility, and inclusion stages (Gawde et al., 2023). The identification stage involved collecting all articles retrieved from the database based on predetermined keywords.

All articles found were then reviewed to remove duplicates based on similarities in title, author, DOI, and research content. The screening stage involved reviewing the titles and abstracts of the articles to assess the relevance of the topics to the research focus. Articles that did not discuss AISI 304, did not use the turning process, or did not address the performance of carbide or HSS tools were eliminated at this stage.

The eligibility screening is conducted by reviewing the full-text articles to ensure they meet the inclusion criteria and that the research data is complete (Warke et al., 2024). The selection process yielded a number of key articles that were used as sources for the analysis in this literature review. All stages of the literature selection process are presented in a PRISMA diagram.

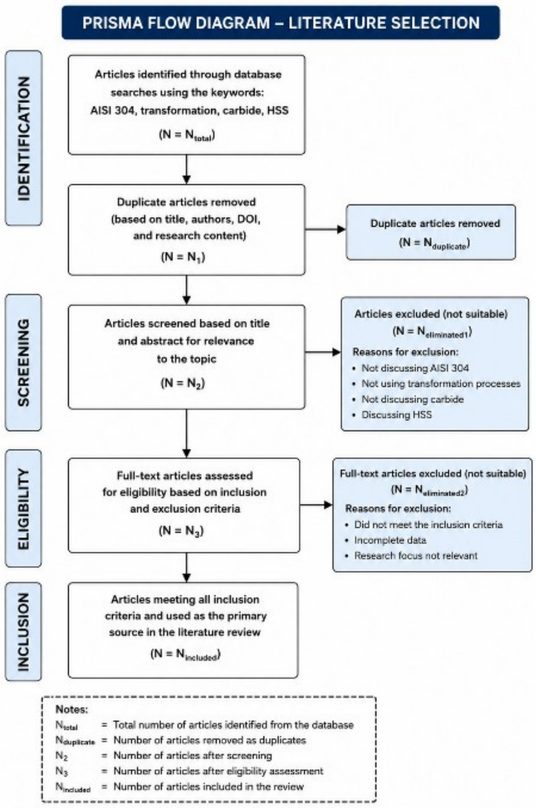

Figure 1. PRISMA Flowchart

D. Analysis Methods

A descriptive comparative analysis was conducted to compare the performance of carbide and HSS tools based on four key parameters: tool life (flank wear criterion VB = 0.3 mm according to ISO 3685), surface roughness (Ra), cutting force (Fc), and cutting temperature. The effects of contextual variables, including cutting speed (Vc), feed rate (f), depth of cut (ap), and cooling method (dry, flood, MQL), were also considered to ensure comparability across studies (Binali et al., 2023). Findings from each article were organized into a comparison matrix as a basis for synthesis and the identification of research gaps.

RESULTS AND DISCUSSION

Austenitic stainless steel AISI 304 is classified as a difficult-to-machine material due to its low thermal conductivity and strong tendency toward work hardening, which leads to heat accumulation at the tool tip and progressive surface hardening with each cutting pass (França et al., 2024) (Singh et al., 2018). These conditions make the selection of cutting tool materials a key determinant of the success of the turning process. Carbide (WC-Co) tools are available in uncoated and coated variants (TiN, TiAlN, TiCN, Al_2O_3) with thermal resistance up to 1000°C, while HSS maintains its hardness only up to 600°C but exhibits higher toughness under intermittent cutting conditions (Kumar Sharma et al., 2020). The literature review generally supports the hypothesis that carbide tools are superior at high cutting speeds, while HSS remains relevant for low-speed applications or specific shock loads, as summarized in Table 2 and Table 3.

Table 2. Summary of Literature Review on Comparison of HSS and Carbide Cutting Tools

Researcher (Year)	Tool Material	Cutting Condition	Key Performance Indicators
(Hidayat, 2021)	HSS, Carbide, PCD	Dry; rotation variation 110–700 rpm	Lowest Ra value (PCD) = 1.026 µm; Highest Ra (PCD) = 3.591 µm
(Çaydaş et al., 2011)	HSS, K20 carbide, TiN-coated HSS	Dry drilling	Tool life: TiN-HSS > K20 > HSS
(Singh et al., 2018)	PVD-coated carbide	Dry, Flooded, NF-MQL	Flanking wear reduction NF-MQL vs dry = 32.26%; vs flooded = 9.68%
(Sivaiah et al., 2021)	PVD-coated carbide (textured)	MQL vs Busasah	T-1 textured cutting tool + MQL yields the lowest Ra, Vb, and cutting temperature
(Aboloje et al., 2024)	HSS vs Karbida	General comparison	Carbide cutting speeds up to 12× HSS; tool life 5–10× longer
(Binali et al., 2023)	HSS vs Karbida	General comparison	HSS critical temperature 500–600°C; carbide up to 1000°C; Ra decreases significantly with MQL compared to dry conditions
(Chinchanikar & Gadge, 2025)	MTCVD & PVD-AlTiN coated	High speed	Ra = 0.3–0.44 µm; cutting force = 18–27 N; tool life = 36–51 min
(Sharma & Gupta, 2019)	Uncoated carbide vs TiAlN/TiN	Dry turning	Multilayer coating reduces flank wear by ~25%, Ra by ~15%, increases tool life by ~200%

(Khan et al., 2024)	Double layer carbide (AlCrN/TiAlN)	Dry, Wet, MQL, ICT	ICT provides the longest tool life

Table 3. Quantitative Data on Tool Wear and Surface Roughness

Researcher (Year)	**Tool Material**	**Main Parameter**	**Tool Wear**	**Surface Roughness (Ra)**
(Khrais & Lin, 2007)	TiAlN-coated carbide	Vc=150 m/min, f=0.15 mm/rev	VB = 0,12 mm (500 m)	Ra = 0,82 µm
	HSS-Co (M42)	Vc=60 m/min, f=0.12 mm/rev	VB = 0,38 mm (200 m)	Ra = 1,64 µm
(Sharma & Gupta, 2019)	Uncoated carbide (K20)	Vc=120 m/min, f=0.10 mm/rev	VB = 0,19 mm (300 m)	Ra = 1,10 µm
(Chinchanikar & Gadge, 2023)	CVD-coated carbide	Vc=200 m/min, f=0.20 mm/rev	VB = 0,10 mm (600 m)	Ra = 0,72 µm
(Bouzid et al., 2018)	HSS-E (P6M5)	Vc=45 m/min, f=0.08 mm/rev	VB = 0,55 mm (150 m)	Ra = 2,10 µm
(Patil & Karande, 2023)	PVD-coated carbide (TiCN)	Vc=180 m/min, f=0.15 mm/rev	VB = 0,09 mm (700 m)	Ra = 0,65 µm

Table 2 consistently shows that coated carbide inserts exhibit significantly lower flank wear over longer cutting distances compared to HSS, even when the HSS is operated at much lower speeds. This pattern is explained by the difference in thermal resistance between the two materials: in AISI 304, which has low thermal conductivity, heat is trapped in the cutting zone, causing HSS to undergo thermal softening earlier and triggering an accelerated degradation cycle, while the TiAlN coating on the carbide acts as a thermal barrier that keeps the substrate stable (Chinchanikar & Gadge, 2023) (Chinchanikar & Gadge, 2025). In addition to flank wear, crater wear on the rake face and notch wear at the cutting depth boundary also pose additional risks, particularly for more brittle carbides. The finding that TiN-coated HSS outperforms uncoated K20 carbide (Table 3) demonstrates that coating can partially compensate for the limitations of HSS, although it does not match the performance of advanced coated carbides at high speeds.

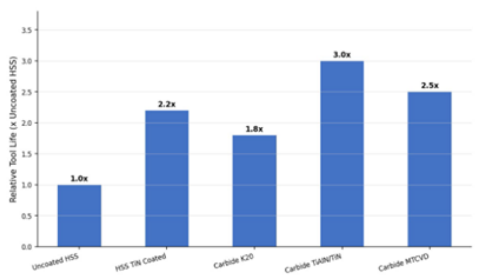

Figure 2. Comparison of relative tool life in turning AISI 304 for various materials and tool coatings

The dominant mechanism affecting surface quality in the turning of AISI 304 is the formation of a built-up edge (BUE), which is triggered by the material's ductile and adhesive properties, causing detached BUE fragments to scratch the surface and increase the Ra value (Sivaiah et al., 2021). Table 3 shows that HSS tools produce an Ra two to three times higher than coated carbide tools under their respective recommended cutting conditions. Figure 2 visualizes this trend: the HSS and carbide curves intersect in the medium-speed range, where carbide begins to demonstrate a growing Ra advantage as rotational speed increases, while HSS experiences increased roughness at high speeds. This indicates that the Ra advantage of carbide is speed-dependent, not absolute (Hidayat, 2021). Coating reduces BUE formation by decreasing tool-workpiece adhesion, which explains the improvement in Ra for coated carbide compared to uncoated carbide (Chinchanikar & Gadge, 2025).

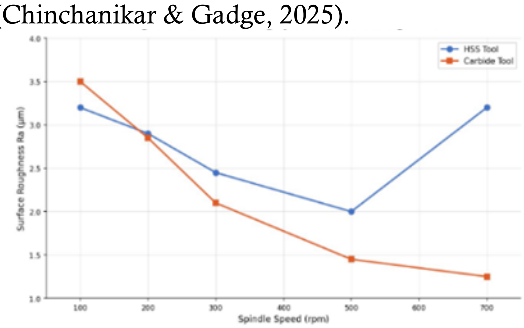

Figure 3. Effect of Cutting Speed on Surface Roughness (Ra) Comparison of HSS and Carbide Chisels

Work hardening progressively increases the cutting resistance of AISI 304, while a worn tool increases the contact area on the flank, causing both force and temperature to rise simultaneously (França et al., 2024). Figure 3 shows a progressive trend of decreasing cutting forces from HSS to textured carbide with MQL, reflecting the combined effect of coating and lubrication in reducing friction in the cutting zone. MTCVD-coated carbide tools recorded the lowest Fc values as listed in Table 1, which were further reduced by the combination of tool texture and MQL through increased lubricant penetration into the cutting zone (Sivaiah et al., 2021).

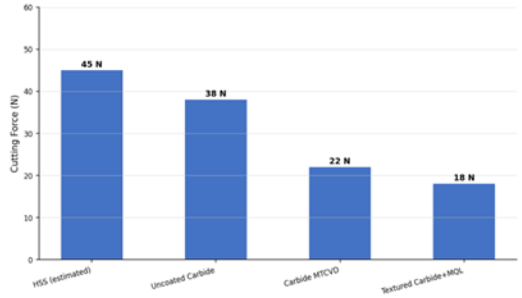

Figure 4. Comparison of Cutting Forces in Turning AISI 304 for Various Types of Tools

Because AISI 304 dissipates heat poorly, the proportion of heat absorbed by the tool is greater than in ordinary carbon steel (França et al., 2024). For HSS, this means that the critical softening temperature is reached earlier, triggering accelerated degradation. Coated carbide tools break this cycle through their thermal barrier properties, enabling them to operate stably at speeds at which HSS would experience rapid failure.

The selection of a cooling strategy has proven to be just as important as the choice of tool material. Figure 5 shows a consistent trend of reduced wear from dry conditions to ICT, indicating that cooling effectiveness is determined more by the precision of fluid delivery to the cutting zone than by the volume of fluid used. NF-MQL provides the best combination of wear reduction and surface quality (Singh et al., 2018), while the combination of textured tools with MQL enhances this effect through improved lubricant distribution (Sivaiah et al., 2021). ICT yields the longest overall tool life, indicating a paradigm shift from high-volume external cooling toward directed internal cooling (Khan et al., 2024).

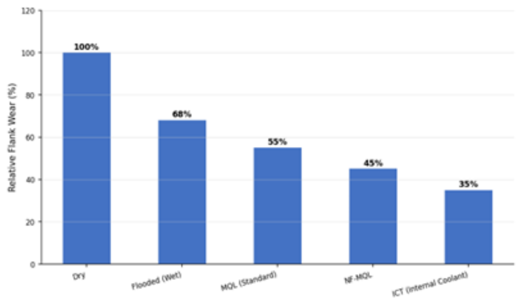

Figure 5. Effect of Various Cutting Conditions on Relative Tool Flank Wear

Although the initial cost of carbide is higher, the significantly longer tool life and ability to operate at higher cutting speeds result in lower costs per component in medium- to large-scale production (Trent & Wright, 2000). For low-volume production or small workshops with intermittent cutting and repeated regrinding, HSS remains economically rational given the low initial investment and ease of sharpening.

Several research gaps have been identified: (1) direct comparisons of HSS vs. carbide using standardized methodologies remain limited; (2) microtexture and nanofluids have not yet been explored for modern HSS grades; (3) comprehensive life-cycle analyses remain scarce; (4) universal predictive models are not yet available; and (5) ICT-MQL hybrid strategies have not been tested on HSS tools (Hidayat, 2021) (Sivaiah et al., 2021) (Chinchanikar & Gadge, 2025).

Overall, the findings from Table 1 and Table 2 support the hypothesis that coated carbide tools are superior for high-speed production on AISI 304, with the caveat that HSS remains relevant at low speeds or under specific conditions. The optimal cooling strategy is NF-MQL or ICT, not conventional wet cooling. The identified gaps open opportunities for further research, particularly in the development of hybrid tooling technologies and more comprehensive predictive models.

CONCLUSION

This systematic literature review confirms that coated carbide tools consistently outperform HSS tools in the turning of AISI 304 austenitic stainless steel across the four key performance parameters examined tool life, surface roughness, cutting force, and cutting temperature, particularly in the industrially relevant range of medium to high cutting speeds. This superiority stems from the thermal stability of TiAlN, AlTiN, and TiCN coatings, which maintain hardness up to 1000°C and suppress built-up edge formation by reducing tool–workpiece adhesion, thereby breaking the degradation cycle accelerated by the low thermal conductivity of AISI 304. Nevertheless, HSS tools remain economically viable under low-speed cutting conditions, intermittent processes, or in small-scale workshop environments that prioritize regrinding flexibility and low initial investment costs. Cooling strategies have proven to play a role on par with tool material selection, where NF-MQL and internally cooled tools (ICT) deliver the best performance by directing fluid to the cutting zone, outperforming conventional flood cooling approaches in terms of wear reduction while being environmentally friendly. Several identified research gaps, including the lack of direct comparisons between HSS–carbide using standardized methodologies, the unexplored microstructure of modern HSS, and the absence of a universal predictive model, opening significant opportunities for further research, particularly in the development of hybrid ICT-MQL strategies and comprehensive AI-based modeling for optimizing tool selection in difficult-to-cut materials.

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AUTHORS' CONTRIBUTIONS

Raditya Alvin Aldiansyah: Conceptualization, methodology, initial draft writing, data curation, and formal analysis. Armando Kabir: Manuscript review and editing, data validation. Aji Prasetya Saputra: Manuscript review and editing, visualization. Nur Syamsi Irvansyah: Literature review and data curation. Muhammad Wi'am Hanif and Laurensius Verdians Putranto: Literature review and data curation. All authors have read and approved the final published version of the manuscript.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

REFERENCES

Aboloje, A. E., Sada, S. O., Ekpu, M., & Eyenubo, J. (2024). Evaluation of the optimal cutting performance of high-speed steel and tungsten carbide cutting tools in the machining of AISI 304 steel. *The International Journal of Advanced Manufacturing Technology*, *130*(7–8), 3609–3617. https://doi.org/10.1007/s00170-023-12909-6

Binali, R., Demirpolat, H., Kuntoğlu, M., & Salur, E. (2023). Different Aspects of Machinability in Turning of AISI 304 Stainless Steel: A Sustainable Approach with MQL Technology. *Metals*, *13*(6). https://doi.org/10.3390/met13061088

Bouzid, L., Berkani, S., Yallese, M. A., Girardin, F., & Mabrouki, T. (2018). Estimation and optimization of flank wear and tool lifespan in finish turning of AISI 304 stainless steel using desirability function approach. *International Journal of Industrial Engineering Computations*, 349–368. https://doi.org/10.5267/j.ijiec.2017.8.002

Çaydaş, U., Hasçalık, A., Buytoz, Ö., & Meyveci, A. (2011). Performance Evaluation of Different Twist Drills in Dry Drilling of AISI 304 Austenitic Stainless Steel. *Materials and Manufacturing Processes*, *26*(8), 951–960. https://doi.org/10.1080/10426914.2010.520790

Chinchanikar, S., & Gadge, M. (2023). Investigations on tool wear behavior in turning AISI 304 stainless steel: An empirical and neural network modeling approach. *Frattura Ed Integrità Strutturale*, *18*(67), 176–191. https://doi.org/10.3221/IGF-ESIS.67.13

Chinchanikar, S., & Gadge, M. (2025). Modelling cutting force for turning AISI 304 stainless steel with PVD-AlTiN coated, PVD-AlTiN coated-microblasted, and MTCVD-TiCN/Al2O3 coated tools. *Advances in Materials and Processing Technologies*, *11*(2), 818–843. https://doi.org/10.1080/2374068X.2024.2341512

França, P. H. P., Barbosa, L. M. Q., Fernandes, G. H. N., Machado, Á. R., Martins, P. S., & da Silva, M. B. (2024). Internally cooled tools: An eco-friendly approach to wear reduction in AISI 304 stainless steel machining. *Wear*, *554–555*, 205490. https://doi.org/https://doi.org/10.1016/j.wear.2024.205490

Gawde, S., Patil, S., Kumar, S., Kamat, P., Kotecha, K., & Abraham, A. (2023). Multi-fault diagnosis of Industrial Rotating Machines using Data-driven approach : A review of two decades of research.

Engineering Applications of Artificial Intelligence, *123*, 106139. https://doi.org/10.1016/j.engappai.2023.106139

Hidayat, R. (2021). ANALISA PENGARUH JENIS PAHAT BUBUT TERHADAP KEKASARAN HASIL BUBUTAN PADA STAINLESS STEEL 304. *International Journal of Sustainable Building, Infrastructure and Environment (IJOSBIE)*, *1*. https://doi.org/10.26877/ijosbie.v1i2.6778

Khan, S. A., Ferreira, F., Oliveira, J., Emami, N., & Ramalho, A. (2024). A comparative study in the tribological behaviour of different DLC coatings sliding against titanium alloys. *Wear*, *554–555*, 205468. https://doi.org/10.1016/j.wear.2024.205468

Khrais, S., & Lin, Y. (2007). Wear mechanisms and tool performance of TiAlN PVD coated inserts during machining of AISI 4140 steel. *Wear*, *262*, 64–69. https://doi.org/10.1016/j.wear.2006.03.052

Kumar Sharma, A., Kumar Tiwari, A., Rai Dixit, A., & Kumar Singh, R. (2020). Measurement of machining forces and surface roughness in turning of AISI 304 steel using alumina-MWCNT hybrid nanoparticles enriched cutting fluid. *Measurement: Journal of the International Measurement Confederation*, *150*. https://doi.org/10.1016/j.measurement.2019.107078

Moganapriya, C., Rajasekar, R., Santhosh, R., Saran, S., Santhosh, S., Gobinath, V. K., & Kumar, P. S. (2022). Sustainable Hard Machining of AISI 304 Stainless Steel Through TiAlN, AlTiN, and TiAlSiN Coating and Multi-Criteria Decision Making Using Grey Fuzzy Coupled Taguchi Method. *Journal of Materials Engineering and Performance*, *31*(9), 7302–7314. https://doi.org/10.1007/s11665-022-06751-2

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Medicine*, *6*(7), e1000097. https://doi.org/10.1371/journal.pmed.1000097

Patil, P., & Karande, P. (2023). Effectiveness of synthetic coolant at 0°C on machining of SS304 with PVD coated TiCN tool to evaluate and compare tool wear and surface finish with conventional machining method. *Tribology - Materials, Surfaces & Interfaces*, *17*(4), 295–308. https://doi.org/10.1080/17515831.2023.2217399

Septi, B., Mounia, K., Salim, B., & Mohamed Athmane, Y. (2024). Evaluation of cutting parameters during dry turning of AISI 304 stainless steel and optimization through a modified WPCA approach. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*, *238*(18), 9072–9091. https://doi.org/10.1177/09544062241246870

Sharma, N., & Gupta, K. (2019). Influence of coated and uncoated carbide tools on tool wear and surface quality during dry machining of stainless steel 304. *Materials Research Express*, *6*(8), 086585. https://doi.org/10.1088/2053-1591/ab1e59

Singh, T., Dureja, J., Dogra, M., & Bhatti, M. (2018). Machining Performance Investigation of AISI 304 Austenitic Stainless Steel under Different Turning Environments. *International Journal of Automotive and Mechanical Engineering*, *15*, 5837–5862. https://doi.org/10.15282/ijame.15.4.2018.10.0447

Sivaiah, P., Kumar, M. R., Subramanyam, S. B., & Prasad, K. L. V. (2021). A comparative study on different textured and untextured tools performance in turning process. *Materials and Manufacturing Processes*, *36*(8), 926–935. https://doi.org/10.1080/10426914.2020.1866201

Trent, E. M. ., & Wright, P. Kenneth. (2000). *Metal cutting*. Butterworth-Heinemann.

Warke, V., Kumar, S., Bongale, A., Kamat, P., Kotecha, K., Selvachandran, G., & Abraham, A. (2024). Improving the useful life of tools using active vibration control through data-driven approaches: A systematic literature review. In *Engineering Applications of Artificial Intelligence* 128. https://doi.org/10.1016/j.engappai.2023.107367