

Mechanics of Metal Cutting and Machining Processes

Your Research Must include:

1. Make a Short Concise Survey (Part I) on the Assigned Machining Process of Table (AA), including their Machine Tools with Main Parts, Operations, Cutting Tools, Workpiece Holding Devices, ..etc. Then, Support your Survey with a Numerical Case Study for ONE of their most common Operations (Including Sketches, Figures, Drawings, Charts and Related Calculations).
2. A Brief Concise Survey (Part II) on your assigned Topic listed in Table (AA) .
3. A numerical Case Study for ORS/ASA transformation, Given the HSS Single Point Tool signature Listed in Data Table(AA)TRY TO FIND THE EQUIVELANT IN THE OTHER System, then make a neat sketch for its Views on different Reference Planes. Then Find the Equivalent Tool which can be used in ORTHOGONAL cutting Process.
4. Make a comparison STUDY for an analytical and a Graphical determination of the different involved force components of the Shear Zone and Within the Rake face, if the measured cutting force components F_z and F_x are listed in Table (AA) together with Cutting tool Orthogonal Rake angle and Chip ratio for your Research Case Study.
5. Tool Wear is a destructive phenomenon one needs to reduce it. Shade some light on its nature mechanism that is taking place during machining processes and they are evaluated in metal cutting processes.
6. For the Case Study shown in Table(AA), where a a new Cutting Tool material is used for the TWO cases, Write down Taylor's Tool Life Formula for it, THEN define the expected Life for the SAME tool if its cutting Velocity is 18 m/min.
7. Make a General Conclusions for the above studied/presented cases.

Best Wishes

Table (AA) : Case Studies Numerical available DATA

For YOUR specific Research (*Case Studies*) Select **ONE** ROW of the following data,

In accordance to YOUR Arabic Name FIRST letter (الحرف الاول من اسمك باللغة العربية)

Select according to 1 st Letter in your Arabic Name	Research Number	Machining Proces(Part I)	Metal Cutting (Part II)	Tube Dimensions ID/OD (mm)	Fz (KN)	Fx (KN)	γ (Rake Angle)	rc	Case Study (I)		Case Study (II)	
									v (m/min)	T (min)	v (m/min)	T (min)
د - ج - ح - خ - هـ	1	Milling	Chip Formation	50/48	8	5	8	0.22	5	20	15	7
ع - غ - ف - ق - ث	2	Shaping	Cutting Tools	38/34	12	8	12	0.08	10	25	15	8
ك - م - ص - ض - ط	3	Turning	Tool Geometry	40/38	8	2.8	6	0.52	14	5	22	1.5
ن - ت - أ - ل - ب	4	Driling	Cutting Force Analysis	30/28	18	10	6	0.8	4	16	8	6
ي - س - ش - ظ - ز	5	Grinding	Tool Wear	100/96	15	6.8	10	0.44	22	10	15	24
و - ر - ذ	6	Milling	Heat and Tool Life	50/46	18	10	12	0.36	10	12	28	4

* Given tool in (ORS) Get it in (ASA) and *Vice Versa*

A (ORS)	6 ⁰	10 ⁰	8 ⁰	6 ⁰	15 ⁰	75 ⁰	0.8mm
B (ASA)	8 ⁰	14 ⁰	60	8 ⁰	7 ⁰	15 ⁰	1/8"
C (ORS)	8 ⁰	12 ⁰	5 ⁰	6 ⁰	20 ⁰	55 ⁰	0.6 mm