

ADVANCED MACHINING OF TITANIUM ALLOYS

**DANIAL
GHODSIYEH**

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ISBN: 978-600-7869-26-0

Roozandish Publication

Authors: Moradi. Mona.1988_ Danial. Ghodsiyeh.1986_
Title & Authors: Advanced Machining of Titanium Alloys\ Mona
Moradi, Danial Ghodsiyeh
Publication: Roozandish, Hamedan, Iran, 2015
Properties: 272 pages
ISBN: 978- 600-7869-26-0
Topic: Solids Mechanics
Iranian National Book Code: 3855564

Roozandish Publications

Director: Reza Ghamarian, Number 24, Mirzadeh Eshghi Street, Hamedan / Iran

Tel: +9881-38250072- **Fax:** +9881-38252439, **Mobile:** +9881-1111876

E-mail: RoozBook578@gmail.com



Title: Advanced Machining of Titanium Alloys

Authors: Mona Moradi, Danial Ghodsiyeh

Publication: Roozandish, 2015

Printing: Chena

Edition: First

Number of prints: 1000

ISBN: 978-600-7869-26-0

Cost: 150000 Rials / 20 €

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پیشرفت‌های تیتانیوم

سرشناسه: مرادی، مونا، ۱۳۶۷ - قدسیه، دانیال، ۱۳۶۴ -
عنوان و نام پدیدآور: ماشین کاری پیشرفته آلیاژهای تیتانیوم/ مونا مرادی، دانیال قدسیه
مشخصات نشر: روزاندیش: همدان، ۱۳۹۴
مشخصات ظاهری: ۲۷۲ ص
شابک: ۹۷۸-۶۰۰-۷۸۶۹-۲۶-۰
موضوع: مکانیک جامدات
شماره کتابشناسی ملی: ۳۸۵۵۵۶۴

نشر روزاندیش

مدیر مسئول: رضا قربان، همدان، خیابان میرزاده عشقی، جنب تالار معلم
تلفن: ۰۲۶-۳۸۲۵۲۴۳۹، ۰۲۶-۳۸۲۵۲۴۳۹، همراه: ۰۹۱۸۱۱۱۸۷۶
پست الکترونیک: RoozBook578@gmail.com



عنوان: ماشین کاری پیشرفته آلیاژهای تیتانیوم

مؤلفان: مونا مرادی، دانیال قدسیه

ناشر: روزاندیش، ۱۳۹۴

چاپ: چنار

نوبت چاپ: اول

شمارگان: ۱۰۰۰

شابک: ۹۷۸-۶۰۰-۷۸۶۹-۲۶-۰

قیمت: ۱۵۰۰۰۰ ریال

((حق چاپ محفوظ است))

Table of Content

Titanium Alloys and its Classification

1.1	Introduction	2
1.2	Attractive Mechanical Properties	4
1.3	Corrosion and Erosion Resistance	9
1.4	Other Attractive Properties	10
1.5	Heat Transfer Characteristics	12
1.6	Commercially Pure and Low Alloyed Titanium Alloys	17
1.7	Titanium Alpha and Near-Alpha Alloys	19
1.8	Alpha-beta Alloys	22
1.9	Beta Alloys	25
1.10	Titanium Amides Intermetallic Alloy	27
1.11	Applications of Titanium Alloys	30
1.11.1	Aircraft Industries	33
1.11.2	Automotive Industries	34
1.12	Chemical composition	35
1.13	Material Properties	36
1.14	Machining Titanium	37
1.14.1	Turning	38
1.14.2	Milling	39
1.14.3	Drilling	39
1.14.4	Tapping	40

1.14.5	Grinding.....	40
1.14.6	Sawing.....	41
1.14.7	Water Jet.....	41
1.14.8	Electric Discharge Machining (EDM) and Wire Electric Discharge Machining (WEDM).....	42
1.14.9	Chem Milling.....	42
1.14.10	Forming Titanium.....	42
1.14.11	Surface Preparation.....	43
1.14.12	Cold Versus Hot Forming.....	44
1.14.13	Stress Relief and Hot Sizing.....	45
1.14.14	Typical Forming Operations.....	45
1.14.15	Brake Forming.....	46
1.14.16	Stretch Forming.....	46
1.14.17	Spinning and Shear-Forming.....	46
1.14.18	Superplastic Forming (SPF).....	47
1.14.19	Other Forming Processes.....	47
1.14.20	Deep Drawing.....	48
1.14.21	Welding Titanium.....	48
1.14.22	Welding Environment.....	49
1.14.23	Inert Gas Shielding.....	49
1.14.24	Weld Joint Preparation.....	50
1.14.25	Weld Quality Evaluation.....	50
1.14.26	Resistance Welding.....	51

EDM and WEDM machining

2.1	Introduction	53
2.2	Working Principle of WEDM.....	59
2.3	Description of the EDM process.....	63
2.4	WEDM process	65
2.5	Accuracy and Speed	68
2.6	Wire EDM Machine	74
2.6.1	Positioning.....	76
2.6.2	Wire movement.....	79
2.6.3	Power Supply	80
2.6.4	Dielectric System	80
2.6.5	Wire Transport and Wire Thread Devices	84
2.6.6	Machine Automation.....	86
2.6.7	Workpiece Fixturing Systems	89
2.6.8	Fixturing Systems	91
2.7	Comparison of die-sinker and wire-cut EDM machines.....	93
2.8	WEDM Machining Parameter	94
2.8.1	Electrical parameters	95
2.8.1.1	Polarity	96
2.8.1.2	Peak current.....	96
2.8.1.3	Pulse Duration / On-Time (ON)	97
2.8.1.4	Pulse Interval / Off-time (OFF).....	97
2.8.1.5	Discharge voltage.....	98
2.8.1.6	Duty factor	99
2.8.1.7	Pulse frequency.....	99
2.8.1.8	Average current.....	99
2.8.1.9	Pulse waveform.....	100

2.8.2	Non Electrical parameters	100
2.8.2.1	Gap size	101
2.8.2.2	Type of dielectric and flushing	101
2.8.2.3	Electrode Wire.....	102
2.9.1	Wire properties.....	104
2.9.2	Material of Wire (electrode).....	111
2.9.3	Size of Wire	113
2.9.4	Plain Wires.....	114
2.9.5	Coated Wires.....	116
2.9.6	Diffusion Annealed Coated Wires.....	118
2.9.6.1	X-Type Wire	119
2.9.6.2	D-Type Wire	120
2.9.6.3	Gamma Coated Wires.....	121
2.9.6.4	Gamma Brass Type Wire	121
2.9.6.5	Gamma X Type Wire.....	122
2.9.6.6	Gamma D Type Wire.....	122
2.9.7	Composite Wires.....	123
2.10	Wire EDM surface layers	124
2.11	Surface integrity in Wire EDM	125
2.12	Influence of Machining Parameter to the Machining Characteristics.....	127
2.12.1	Influence of wire material characteristics.....	129
2.12.2	Effect of wire tension.....	129
2.12.3	Influence of dielectric (Flushing technique).....	130
2.12.3.1	Function of dielectric fluid.....	130
2.12.3.2	Choosing dielectric liquid	130
2.12.3.3	Flushing method	131
2.12.3.4	Flushing Pressure	131

2.12.3.5	Effect of frequency	132
2.12.3.6	Heat affected zone	134
2.12.3.7	Thickness of the Workpiece.....	135
2.12.3.8	Material of the Workpiece	135
2.13	WEDM machining characteristics	136
2.13.1	Material Removal Rate, MRR.....	136
2.13.2	Surface roughness, Ra	138
2.13.3	Electrode Wear rate (EWR).....	139
2.13.4	Tolerances	140
2.14	Properties of EDM Wires	140
2.15	Wire Types & Researches Review	143

Abrasive ElectroChemical Grinding (AECG) & Abrasive Water Jet Machining (AWJM)

3.1	Introduction	154
3.2	A comparative study of surface integrity of Ti-6Al-4V alloy machined by EDM and AECG.....	155
3.3	Water Jet and Abrasive Water Jet Machining	156
3.3.1	Introduction	156
3.3.2	Application	158
3.3.3	Materials.....	158
3.3.4	Machine	160
3.3.5	Mixing	164
3.3.6	Suspension Jet.....	168
3.3.7	Catcher	169
3.3.8	Mechanism of material removal.....	170

3.3.9	Machining of Titanium Alloy Assisted by High Pressure Water jet.....	178
3.3.10	Tool Life	180
3.3.11	Wear Mechanism.....	183
3.3.12	Surface Profile	184
3.3.13	Chip Formations.....	187

Laser beam machining (LBM)

4.1	Introduction	190
4.2	fundamentals of the LBM.....	191
4.2.1	Light and lasers	191
4.2.2	Principle of LBM.....	192
4.2.3	LBM variations.....	194
4.2.4	Laser-based hybrid/cross/assisted machining.....	297
4.3	LBM applications.....	201
4.4	Experimental studies.....	205
4.4.1	Material removal rate (MRR).....	208
4.4.2	Machined geometry.....	209
4.4.3	Surface roughness.....	211
4.4.4	Metallurgical characteristics.....	213
4.4.5	Mechanical properties.....	215

Conventional Machining

5.1	Introduction	217
5.2	Machinability versus Titanium Properties	219
5.2.1	Overview	219
5.2.2	Influences of titanium properties on machinability	220
5.3	Espeacial Techniques to Improve Machinability	220
5.3.1	Overview	220
5.3.2	Techniques	226
5.4	Machining Forces	227
5.4.1	Overview	227
5.4.2	Dynamic forces versus cutting parameters	228
5.4.3	Static forces versus cutting parameters	228
5.5	Chip Formation	239
5.5.1	Overview	239
5.5.2	Chip morphology and formation mechanism	239
5.5.3	Evolution of chip morphology	241
5.6	Cutting Temperature	245
5.6.1	Overview	245
5.6.2	Evolution of cutting temperature	246
5.7	General Overview	247
5.7.1	Built-up edge	248
5.7.2	Cutting techniques	248
5.7.3	Cutting forces	249
5.7.4	Chip formation	249
5.7.5	Cutting temperature	250

ABSTRACT

In less than fifty years, Titanium has become a leading industrial metal. Titanium based alloys are advanced materials used in wide range of engineering applications. The utilization of these alloys comprises of multi-disciplinary fields such as aerospace, space crafts, marine, automobile, gas-turbine engine, military ballistic armor, nuclear, chemical vessels, sports and medical applications. During conventional machining of these materials, higher tool wear and lower surface quality are the commonly observed phenomena, due to their higher strain hardening effect, pseudo elastic behavior and high toughness. To overcome these problems, they can be effectively machined by non-conventional machining processes.

In this book different types of titanium alloys have been described. Furthermore, the principles of main advance machining methods which are widely used for machining of this material including laser machining, Water Jet Machining (WJM), Electro Discharge Machining (EDM) and Wire-EDM (WEDM) are briefly discussed. In addition, significant industrial and academic researches contributing to the performance measurements in machining of titanium, such as material removal rate, cutting speed, surface roughness, tool wear ratio and surface integrity characteristics are discussed. Moreover, special techniques for cutting improvement of titanium in conventional machining are discussed.

Finally, since titanium is an expensive and widely used material, this book provides useful information to find optimal machine settings which play a crucial role in order to increase economic efficiency.