

Panoramica sui processi di produzione

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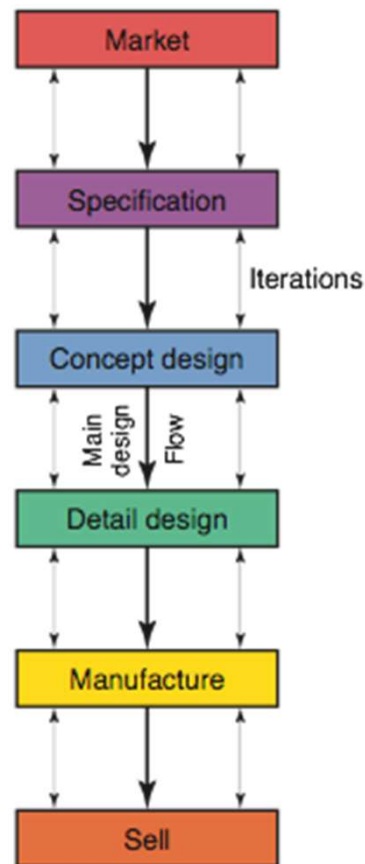


Tipi di processi produttivi

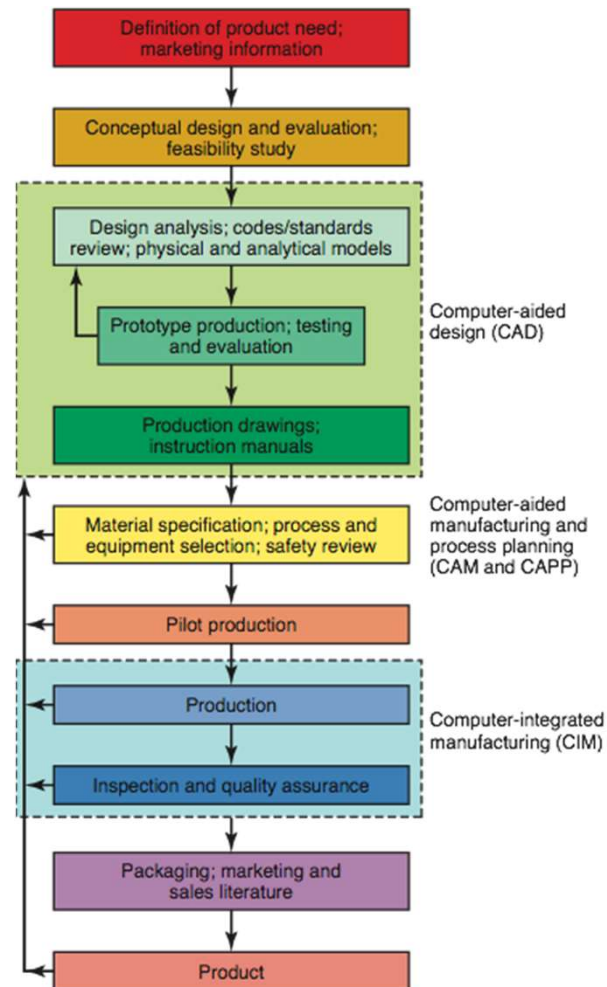
- Processi continui
- Processi discreti o “MANUFATTURIERI”



Ciclo di vita del prodotto



Design for Manufacturing



Materiali di interesse ingegneristico

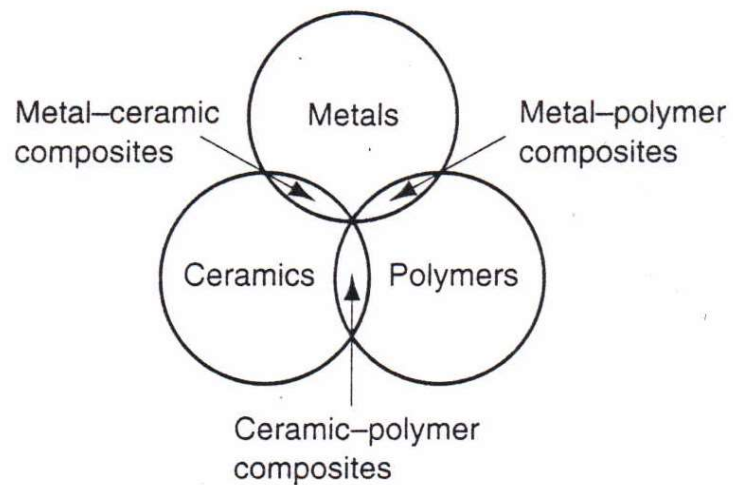
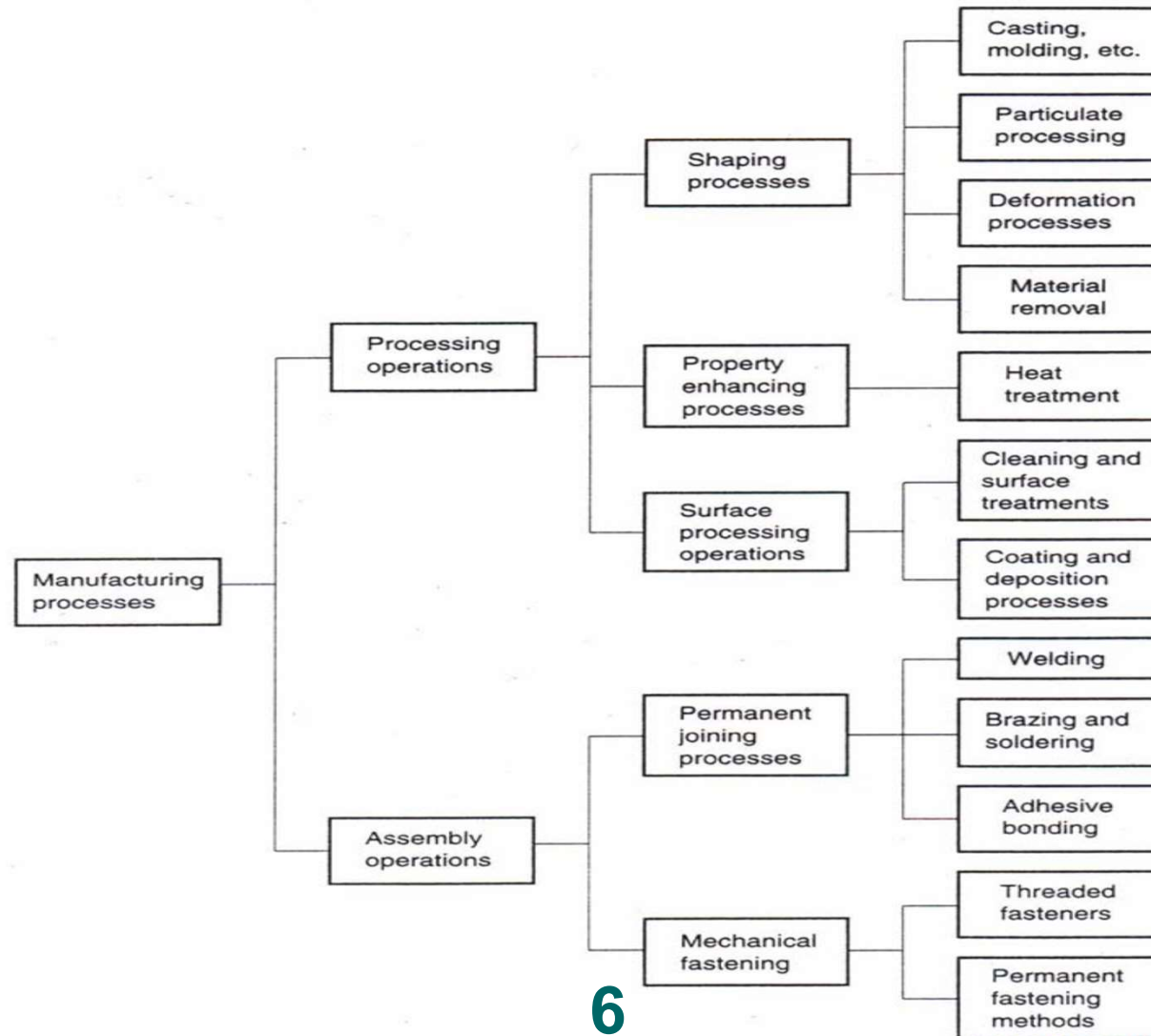
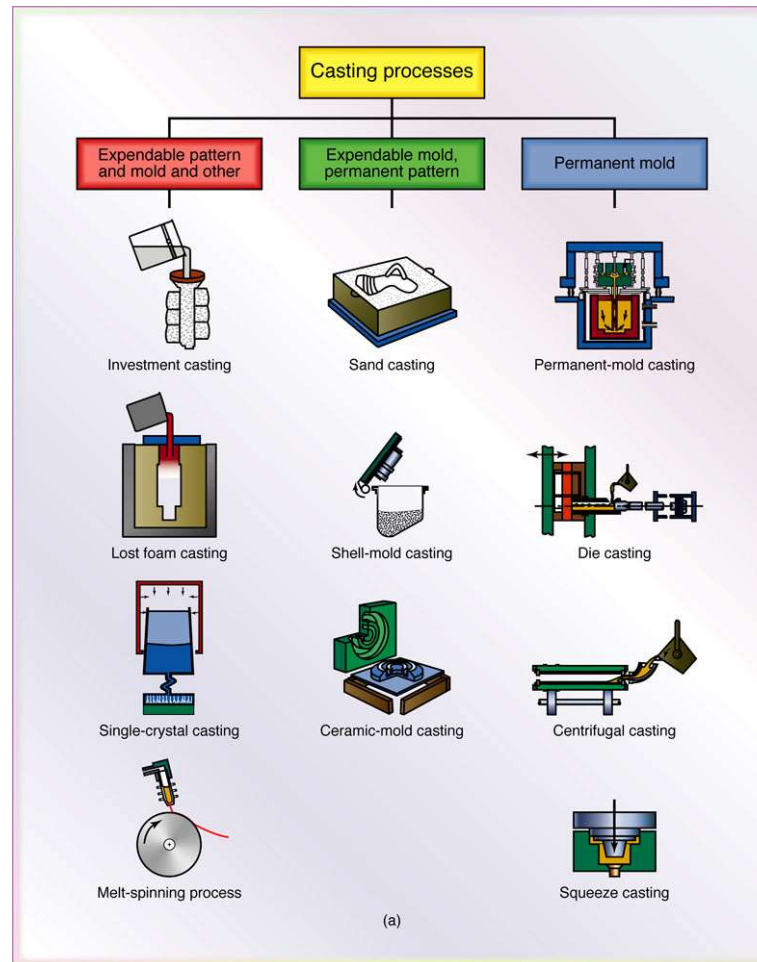


Diagramma di Venn che rappresenta i tre principali tipi di materiali più i compositi.

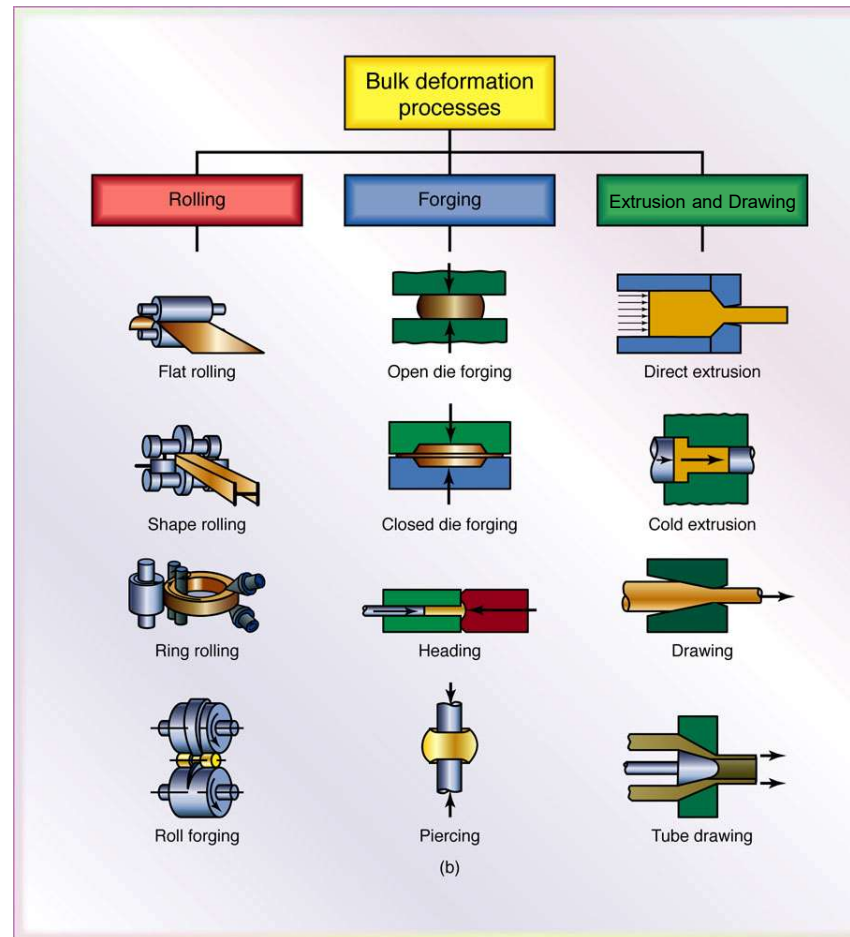
Classificazione dei processi di manifattura



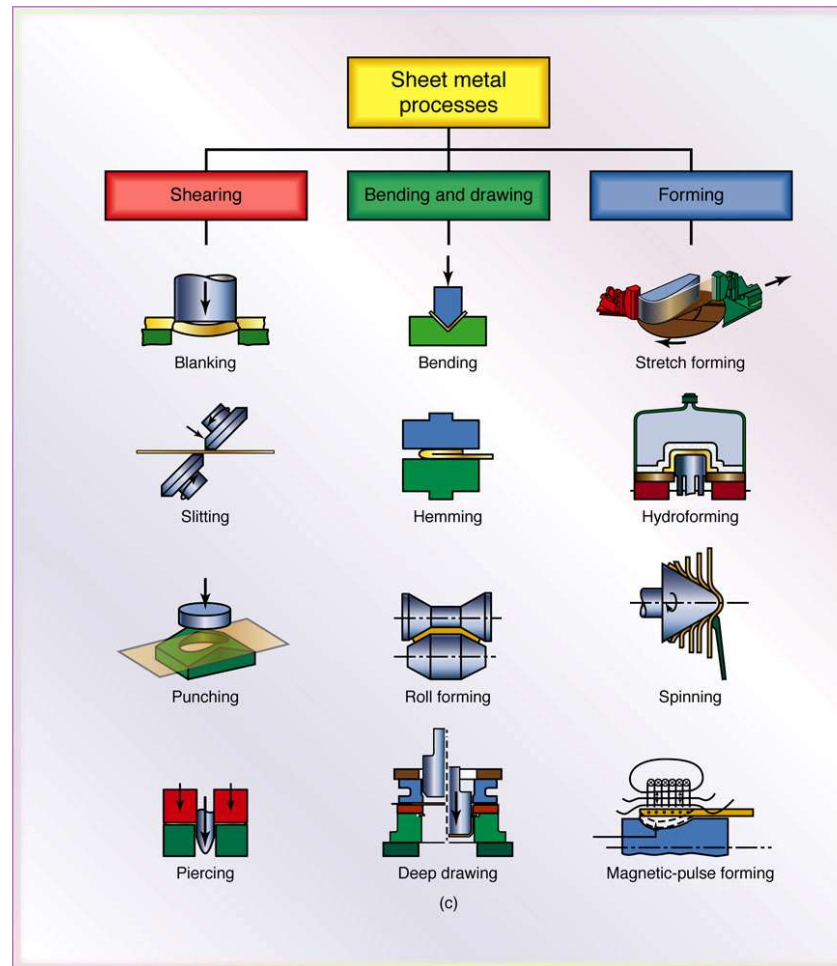
Lavorazioni di fonderia



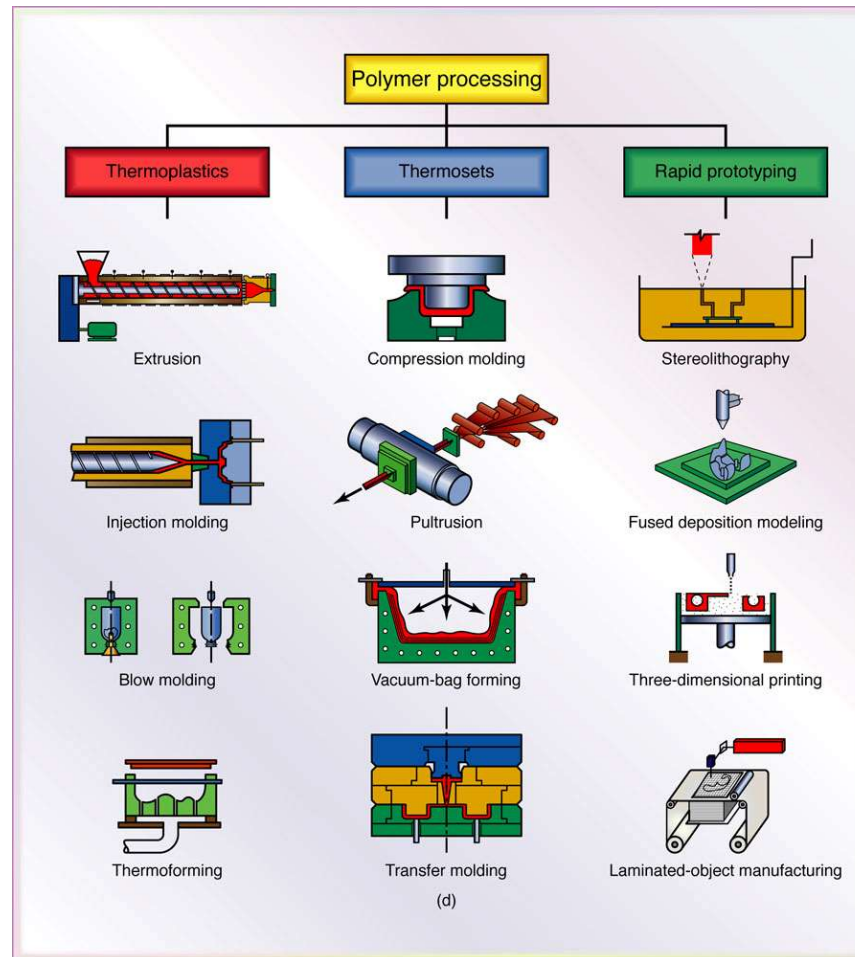
Lavorazioni per deformazione plastica



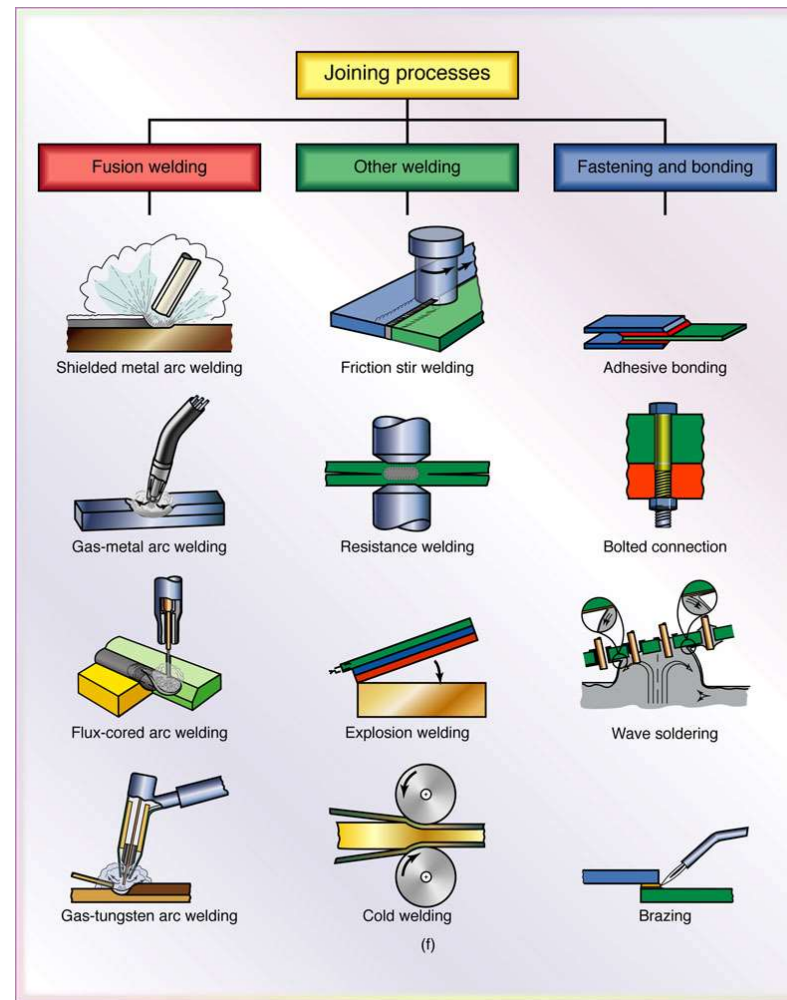
Lavorazione delle lamiere



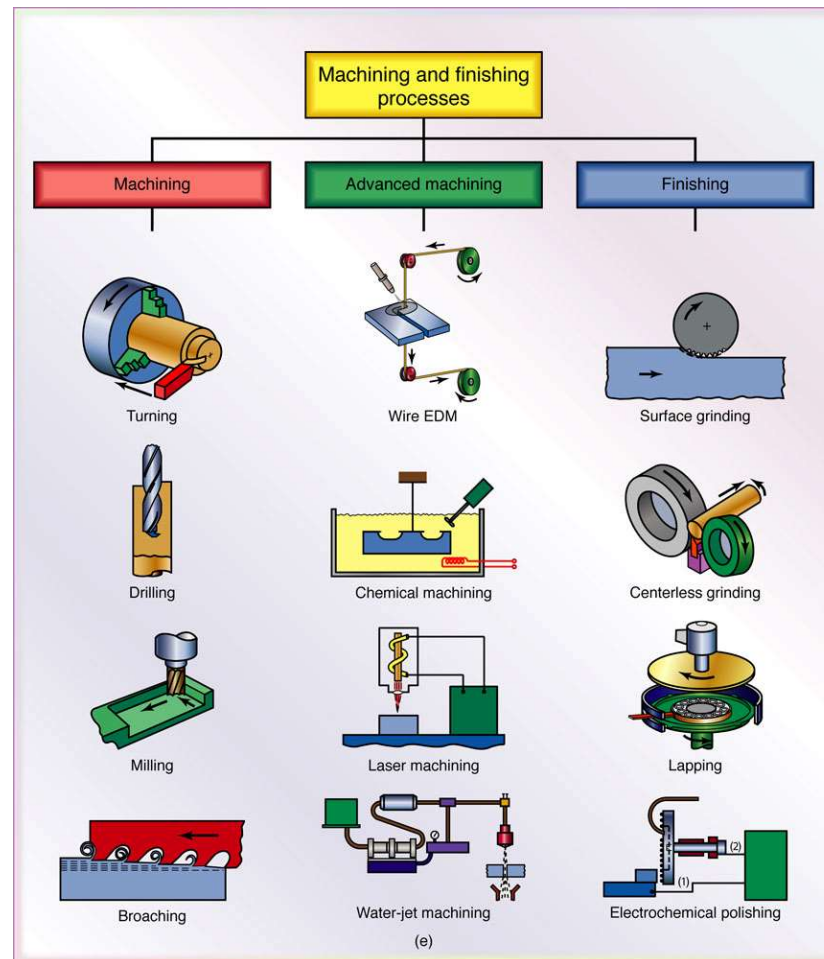
Lavorazione dei polimeri



Giunzioni

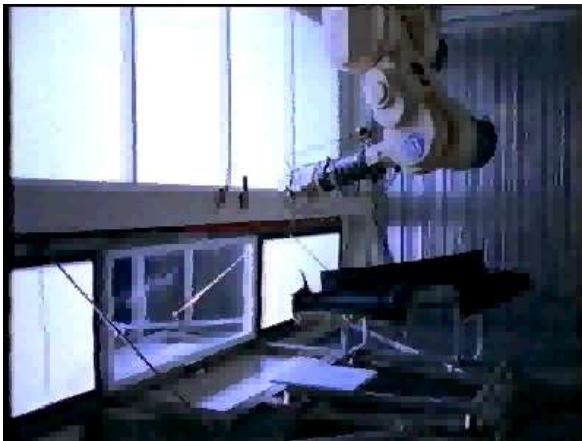


Lavorazioni per asportazione



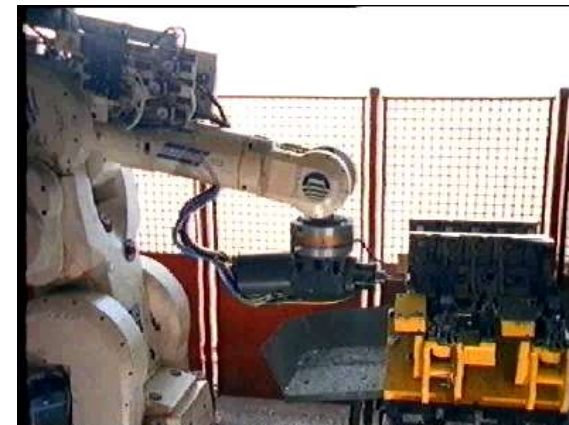
Esempi

Welding



AWC cutting

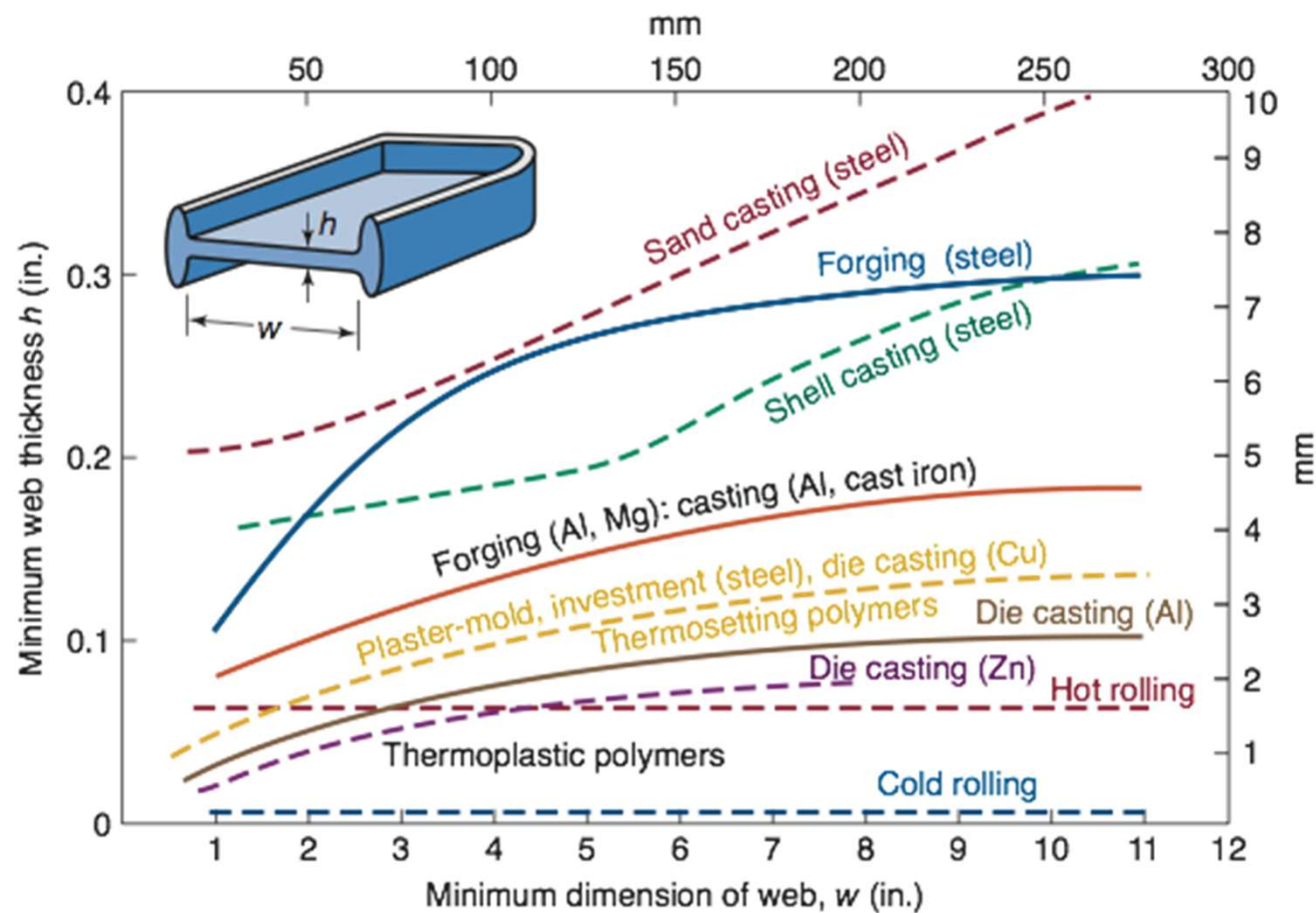
Machining



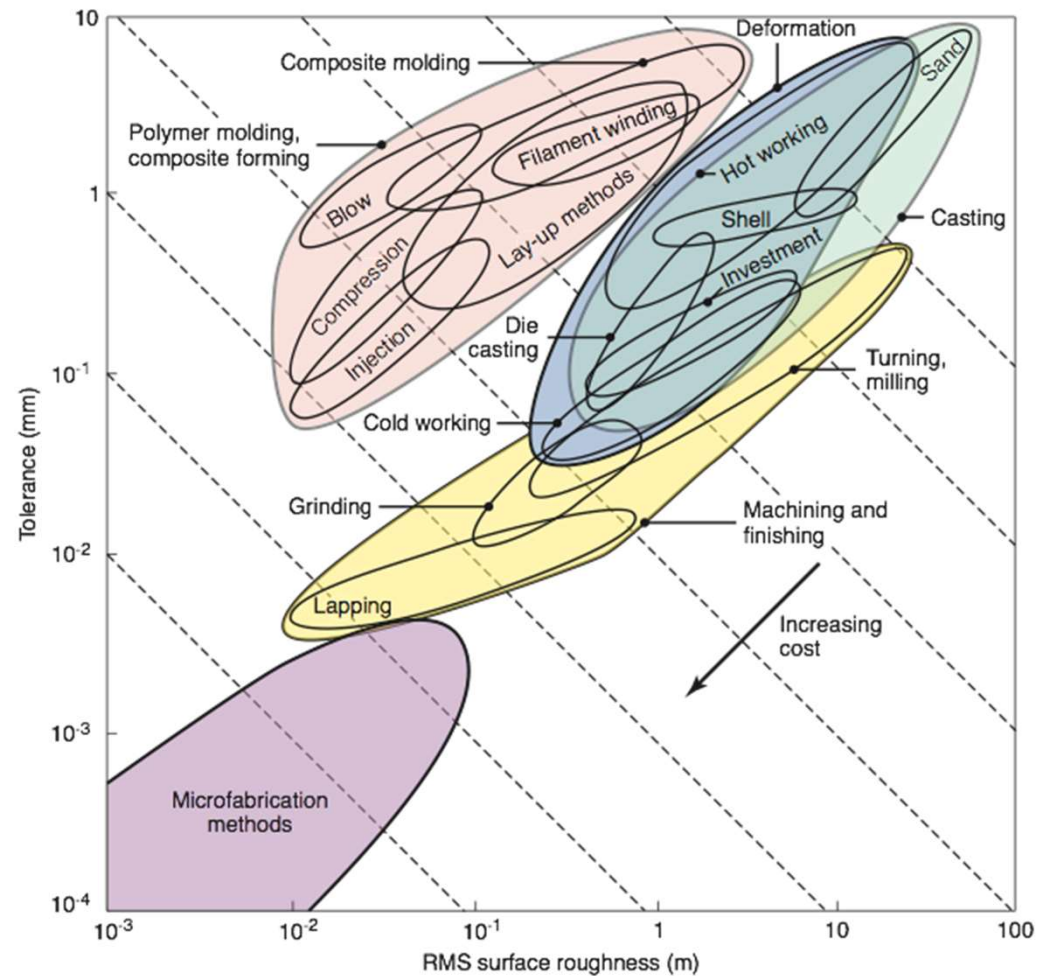
Snagging

Dipartimento di Ingegneria
Gestionale e della Produzione

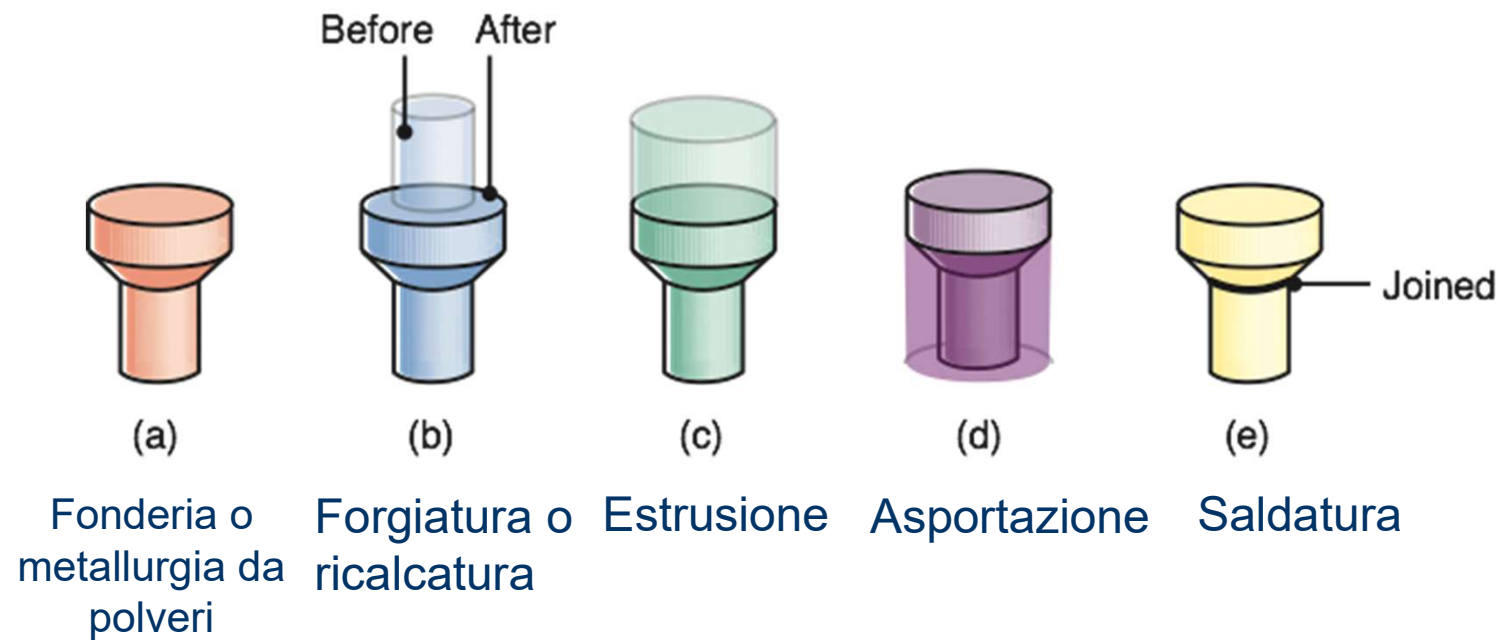
Accuratezza



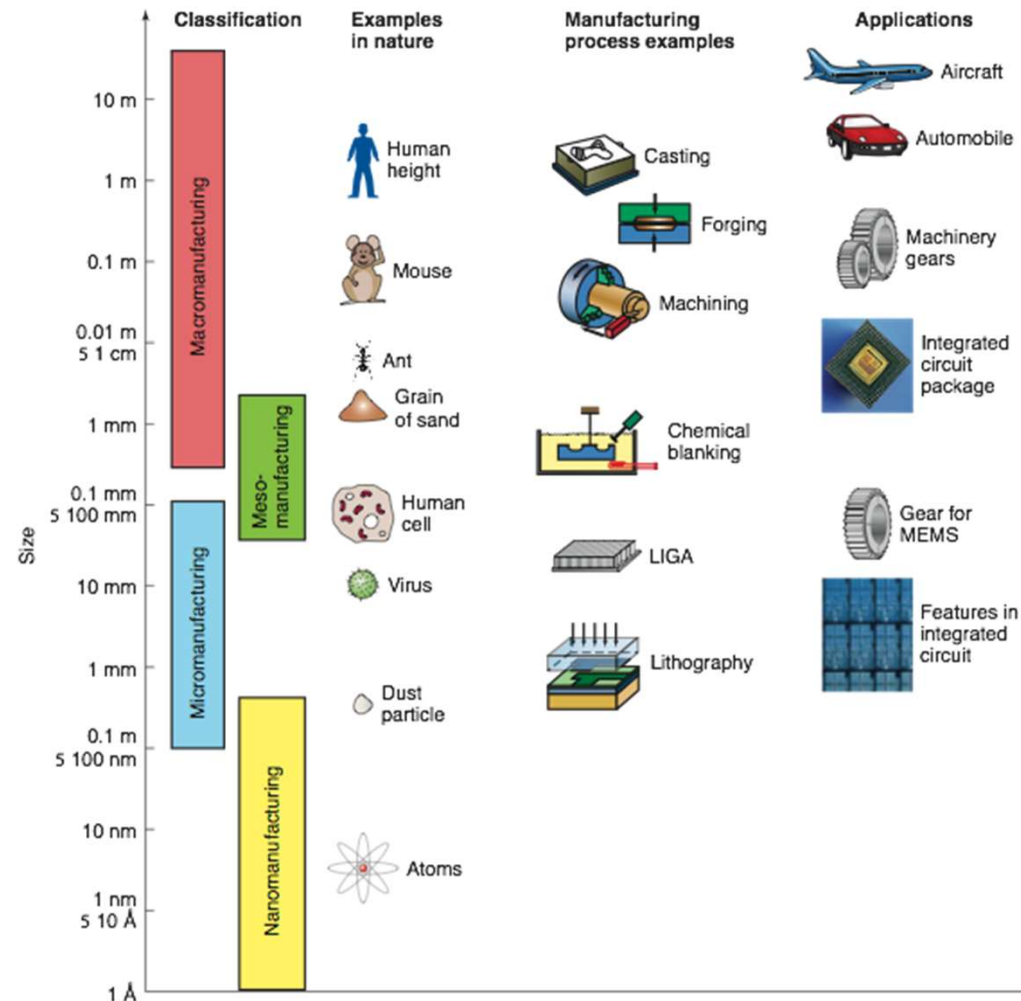
Grafo di Ashby



Soluzioni diverse di lavorazione



Scale di trasformazione



Scelta del processo manifatturiero

Fattibilità tecnica

Profittabilità



Processo manifatturiero

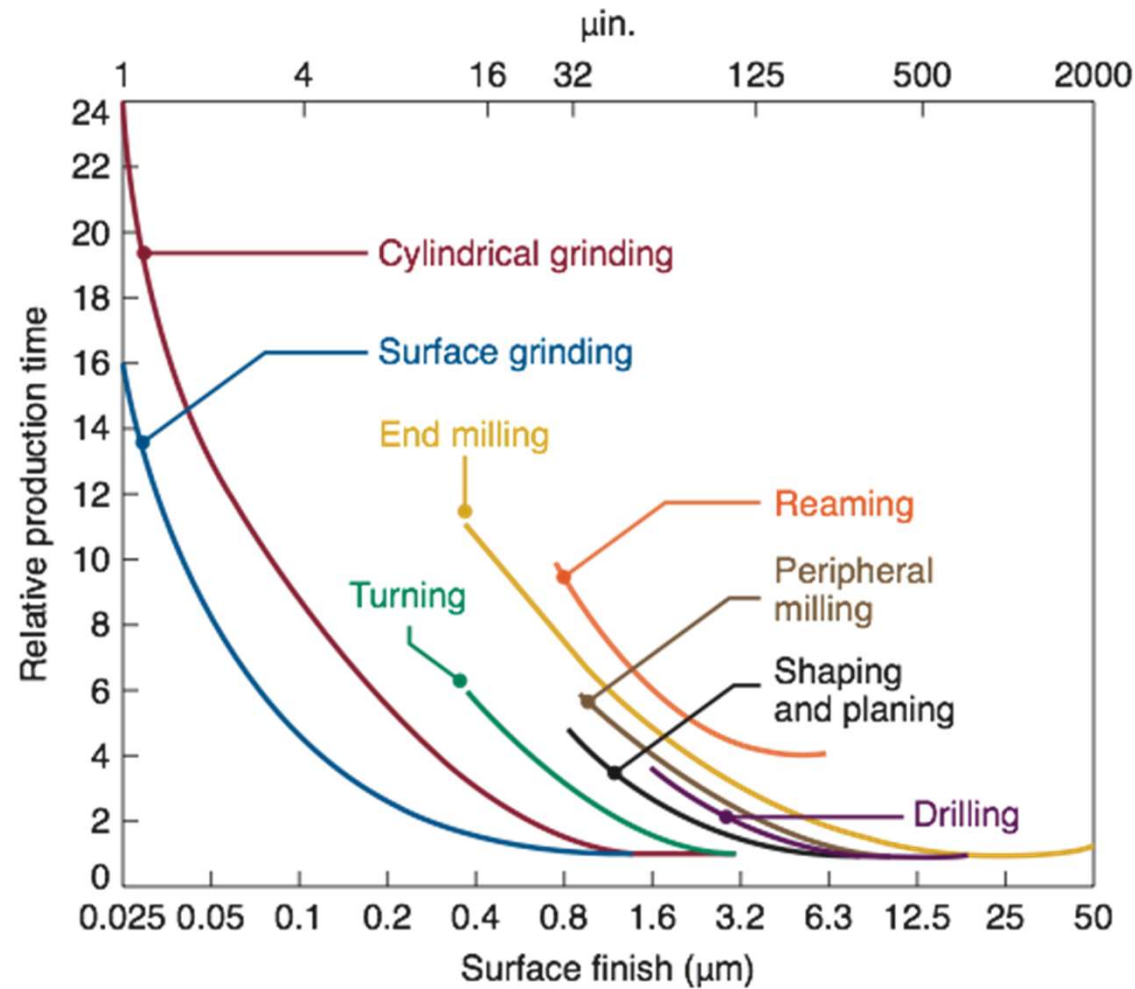
Fattibilità tecnica

I processi devono garantire:

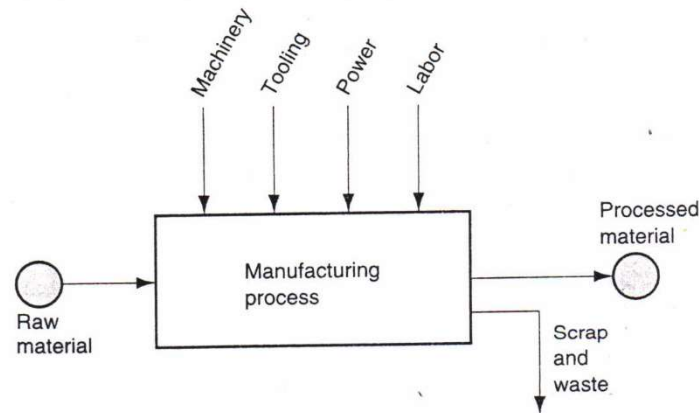
- Il rispetto delle specifiche tecniche
- Il tempo di produzione
- La regolamentazione ambientale
- La sicurezza operativa



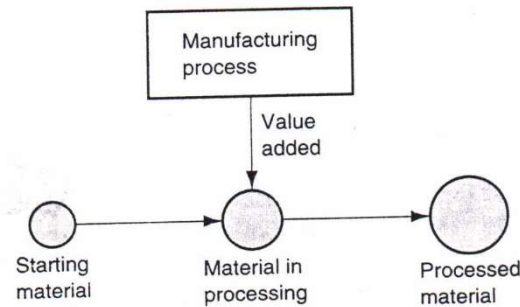
Tempo di produzione



Diversi aspetti del processo

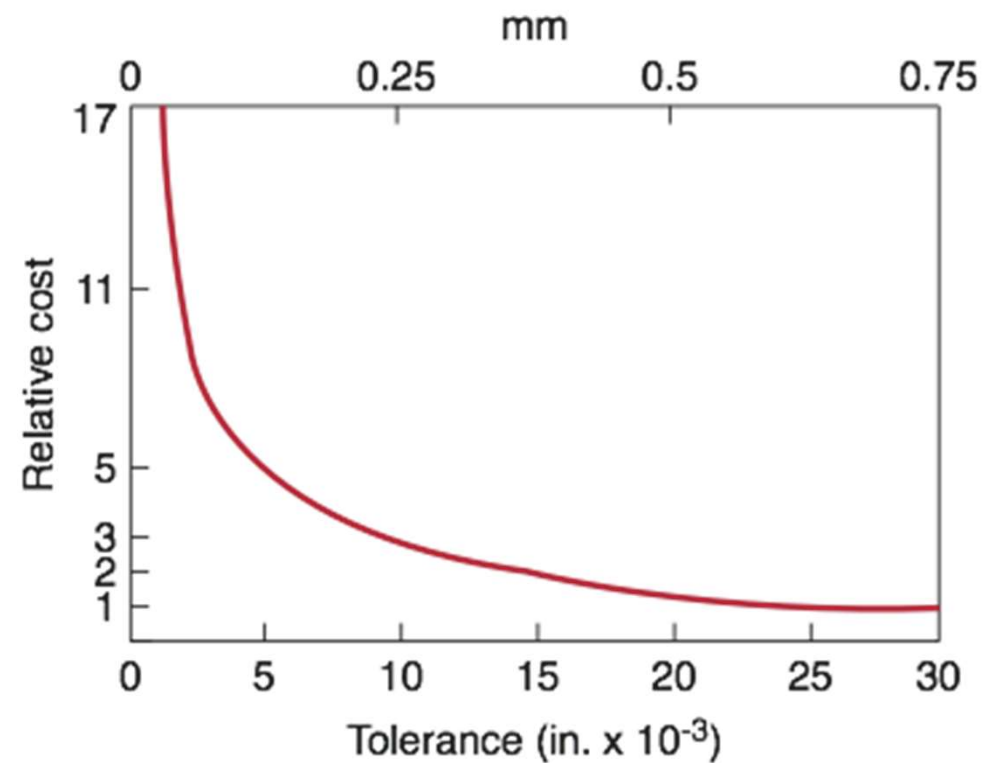


(a)



(b)

Fattibilità economica



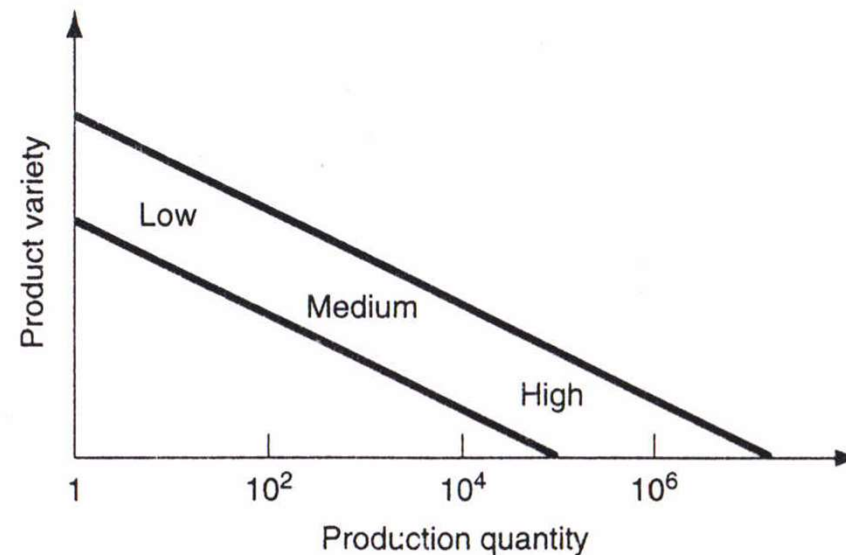
Prezzi delle macchine utensili

Type of machinery	Price range (\$000)	Type of machinery	Price range (\$000)
Broaching	10-300	Machining center	50-1000
Drilling	10-100	Mechanical press	20-250
Electrical discharge	30-150	Milling	10-250
Electromagnetic	50-150	Ring rolling	>500
Extruder	30-80	Robot	20-200
Fused deposition modeling	40-200	Roll forming	5-100
Gear shaping	100-200	Rubber forming	50-500
Grinding		Stereolithography	80-500
Cylindrical	40-150	Stretch forming	400 - > 1000
Surface	20-100	Transfer line	100 - > 1000
Headers	100-150	Welding	
Injection molding	30-200	Electron beam	75-1000
Jig boring	50-150	Gas tungsten arc	1-5
Horizontal boring mill	100-400	Laser beam	60-1000
Flexible manufacturing system	> 1000	Resistance, spot	20-50
Lathe	10-100	Ultrasonic	50-200
Automatic	30-250		
Vertical turret	100-400		

Note: Prices vary significantly, depending on size, capacity, options, and level of automation and computer controls.



Relazione tra flessibilità e produttività

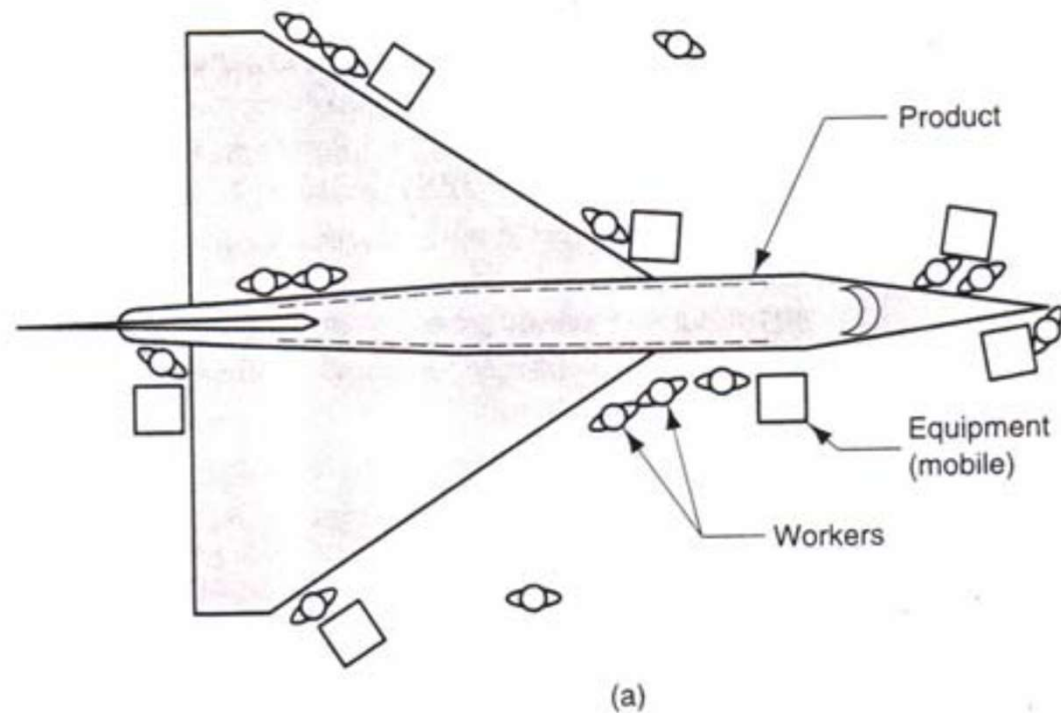


Relazione tra varietà di prodotti e quantità di produzione nella produzione di pezzi discreti.

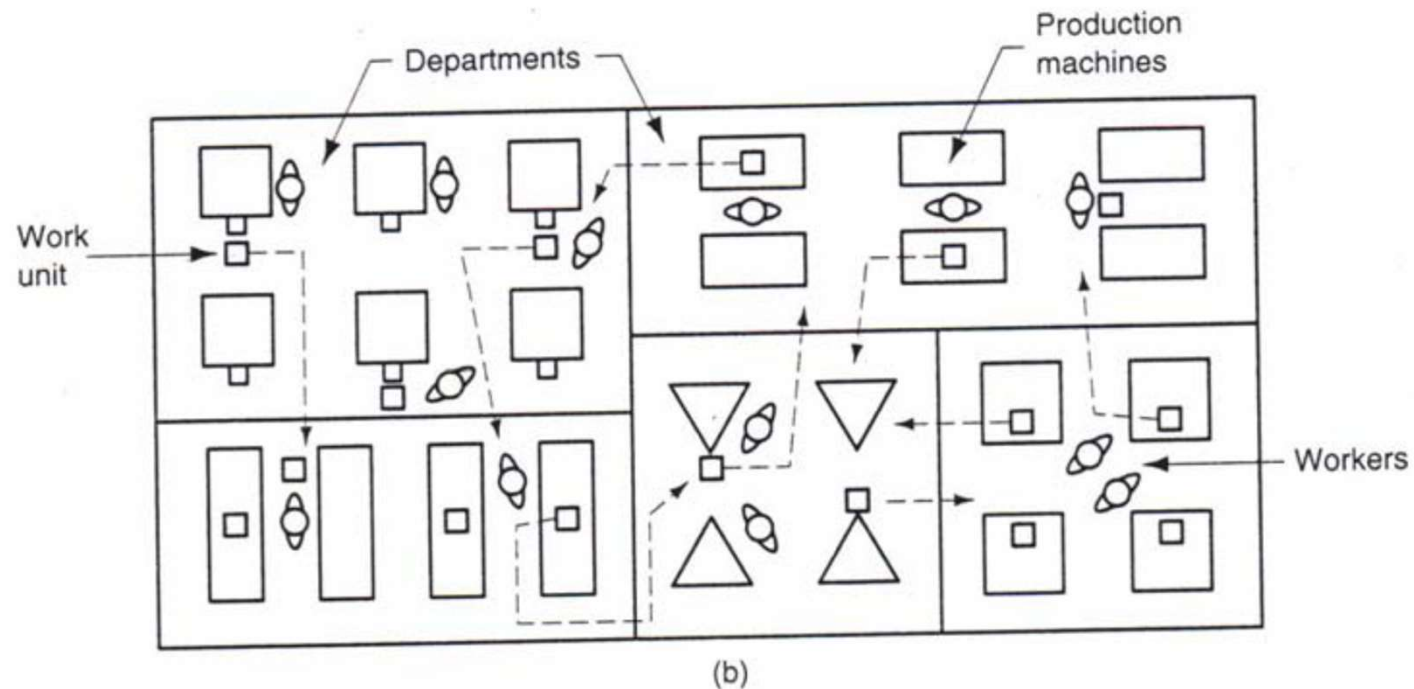
Gli impianti di produzione tendono a posizionarsi tra le due rette



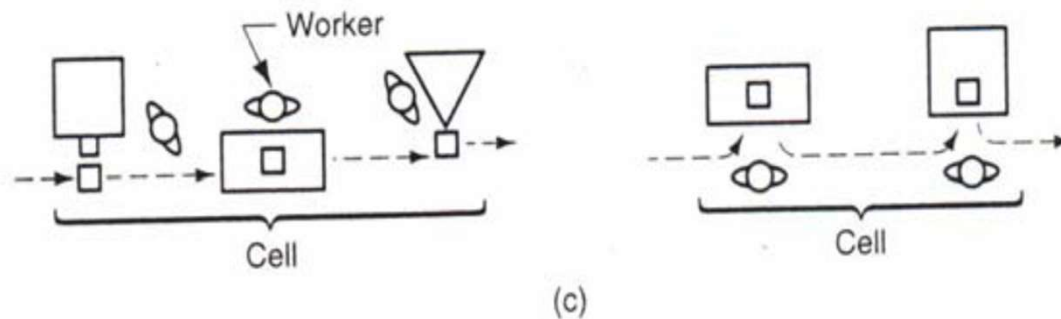
Layout fisso



Layout per processo



Manifattura cellulare



Layout per prodotto

