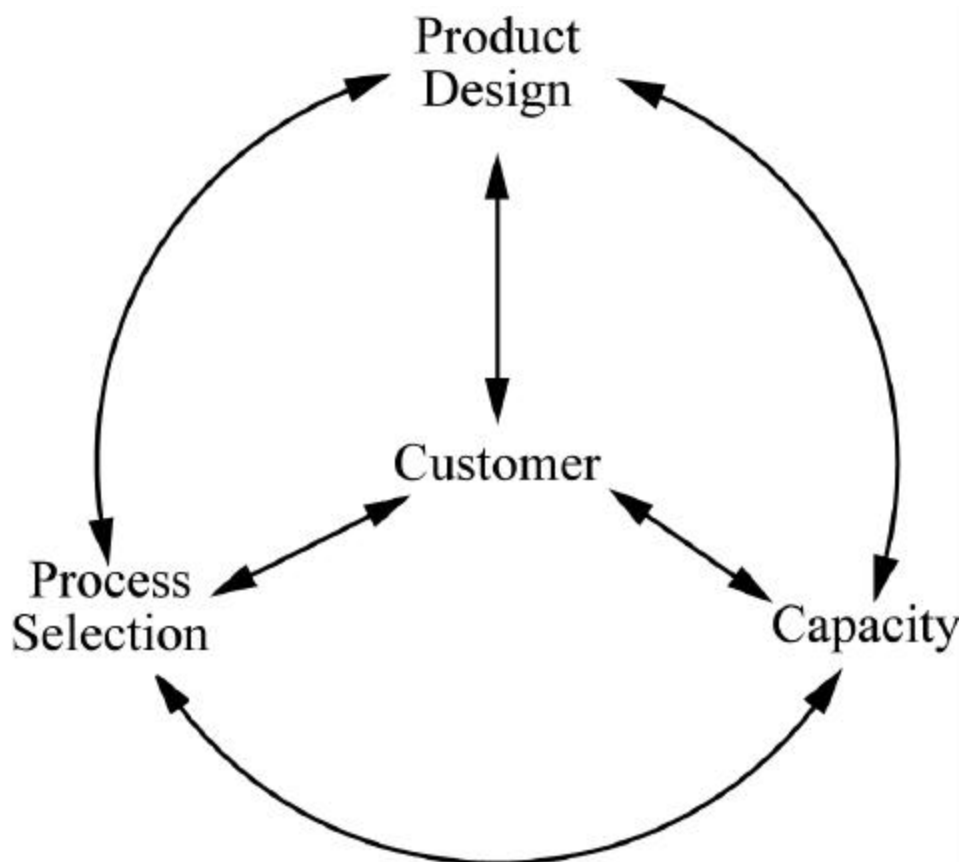
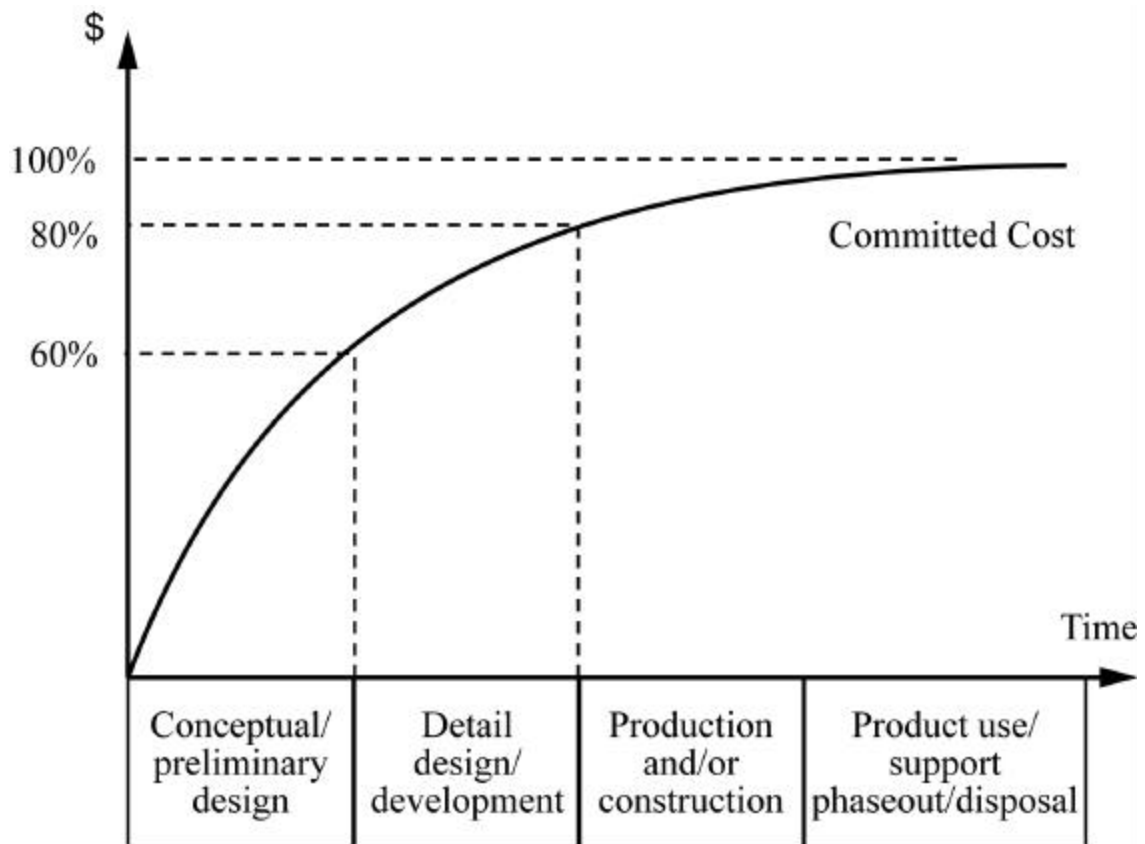


**Combining the  
Resource Consumption  
Model (RCM)  
and the  
Cambridge Engineering  
Selector (CES)  
to Analyze Product Design**

# Product Design and Manufacturing Process Selection



# Product Life Cycle Cost



# Computer-Based Tools

- *CAD*
- *CAE*
- *CAM*
- *CAPP*

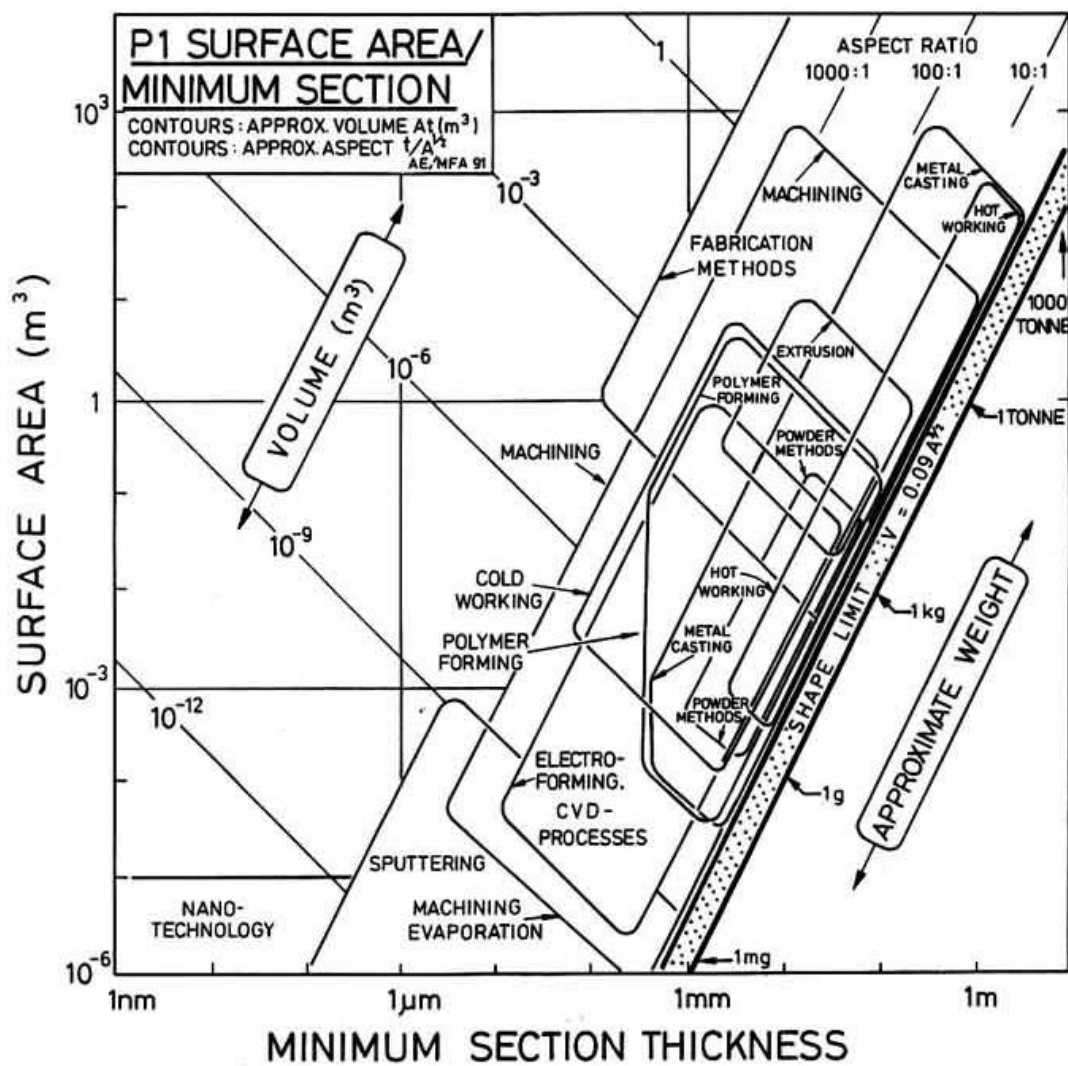
*Key to the future: Integration!*

- *CIM*

# The Cambridge Engineering Selector

- *Materials Selection*
- *Process Selection*
- *Originally Chart-based*
- *Now Computer-based*

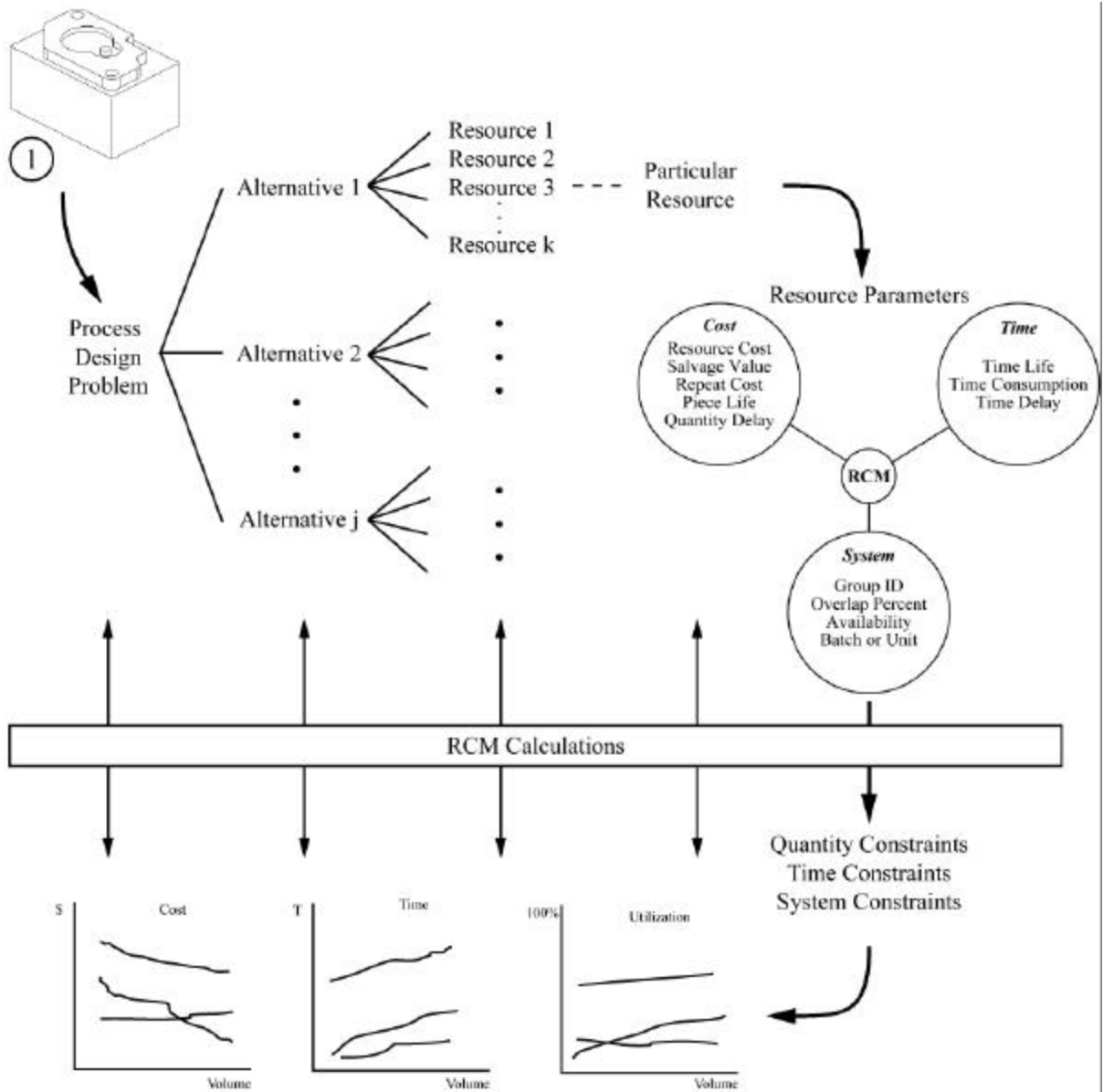
# CES Process Selection Chart



# The Resource Consumption Model

- *Cost, Capacity, and Production Time are integrated*
- *Research Model*

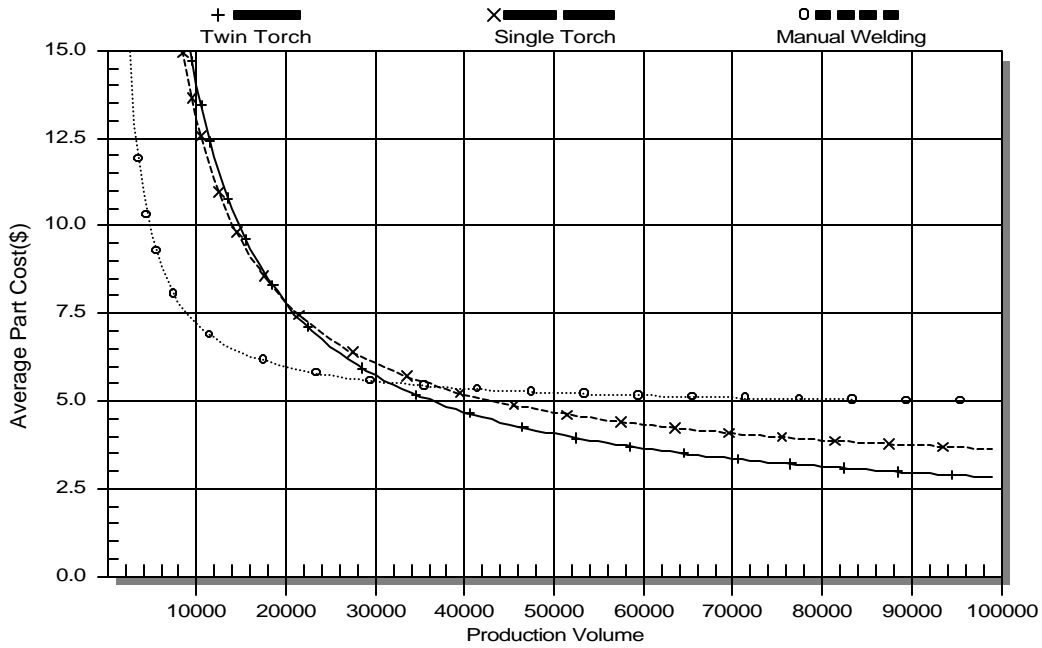
# RCM Overview



# RCM Results

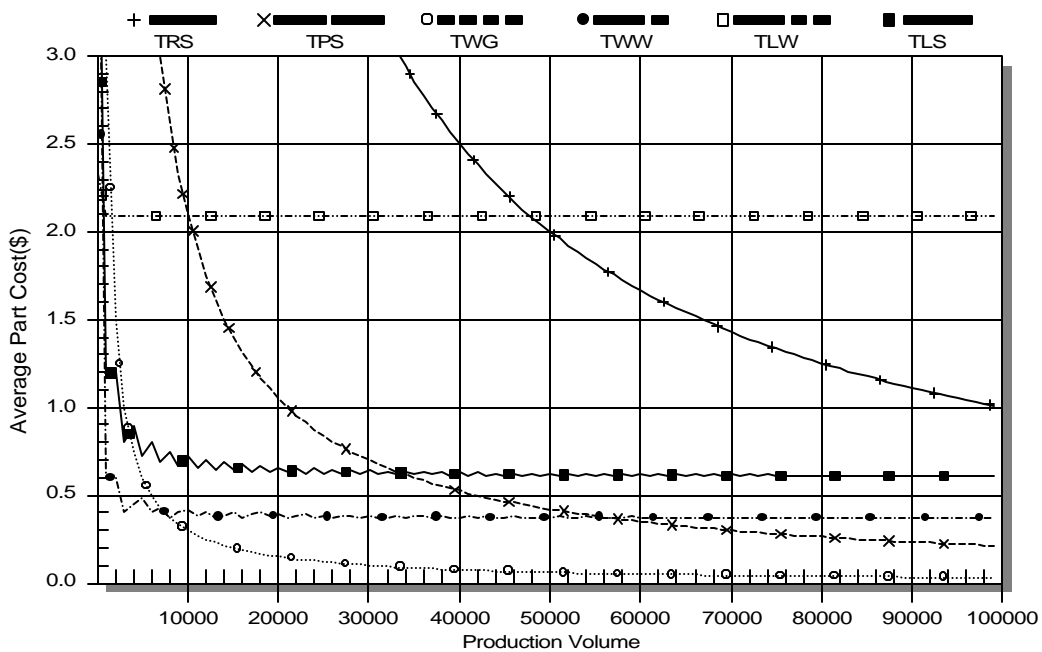
## Average Part Cost(\$) vs Production Volume

Proj= Should the tandem or single torch robotic system be purchased? , for Selected Alternatives

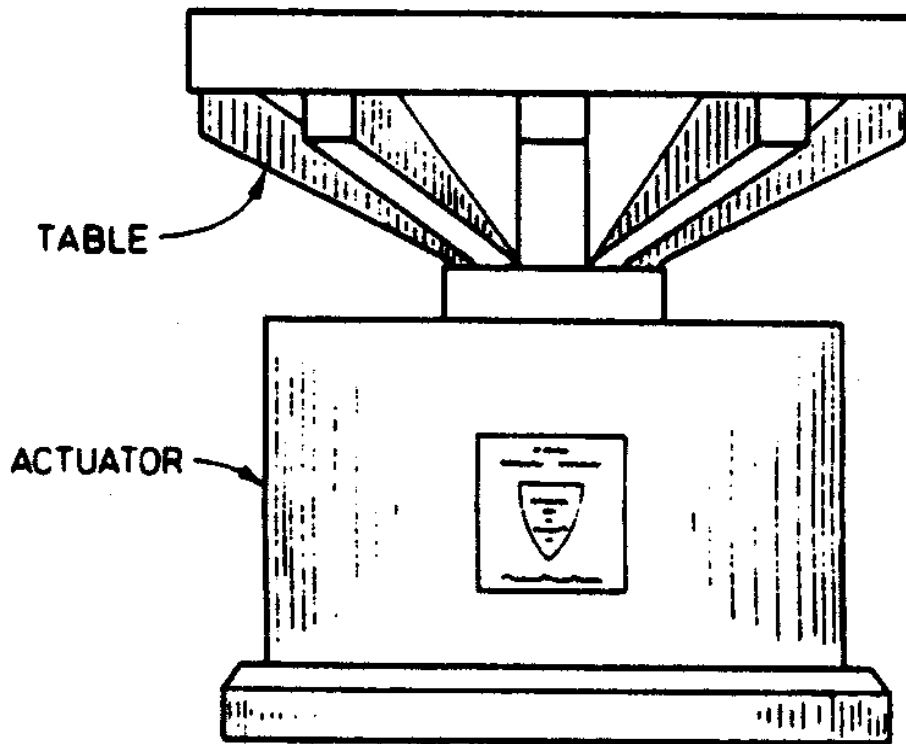


## Average Part Cost(\$) vs Production Volume

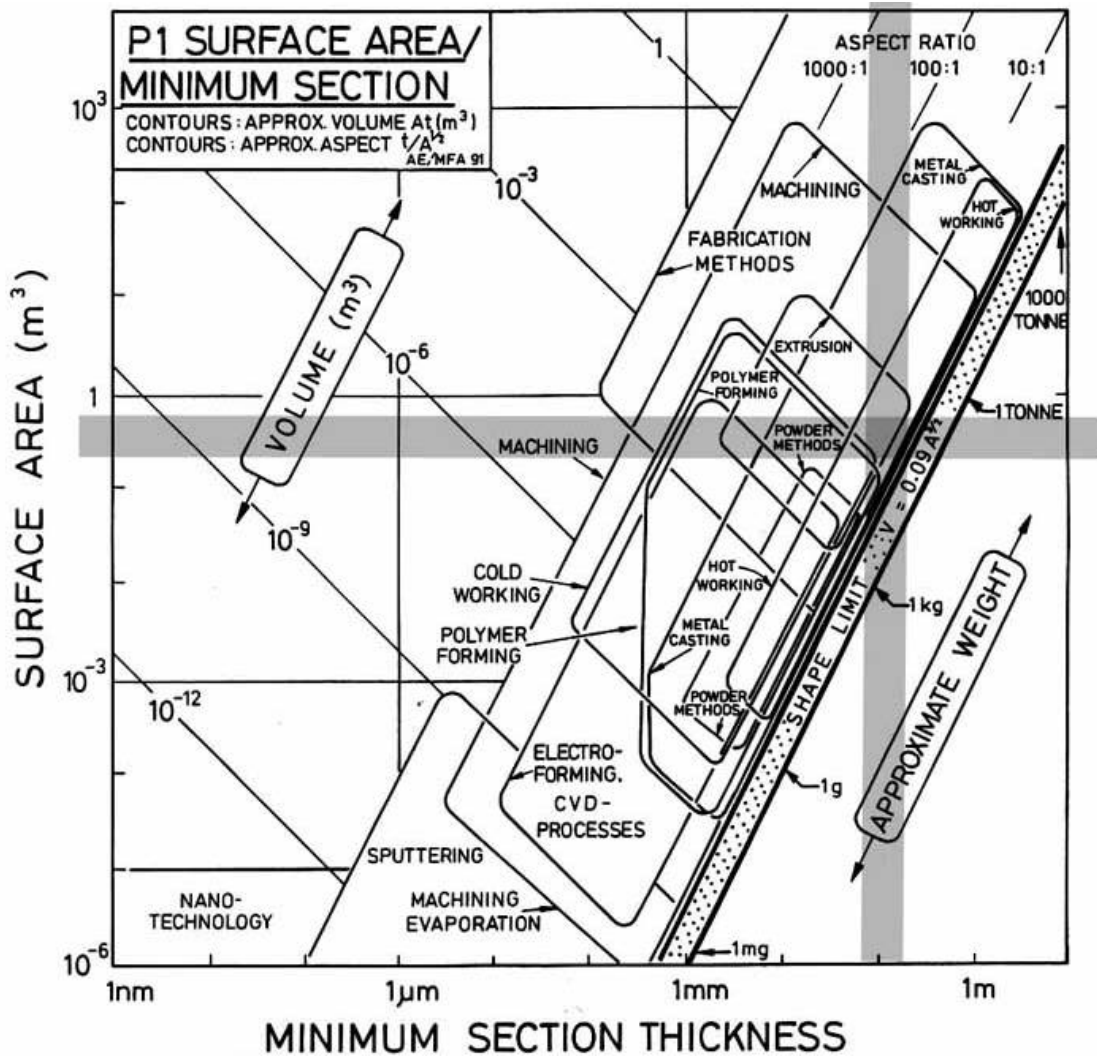
Proj= P3, Alt= Twin Torch, Selected Resources



# An Application of CES and RCM: Shaker Table Design



# Methodology – CES Process Selection

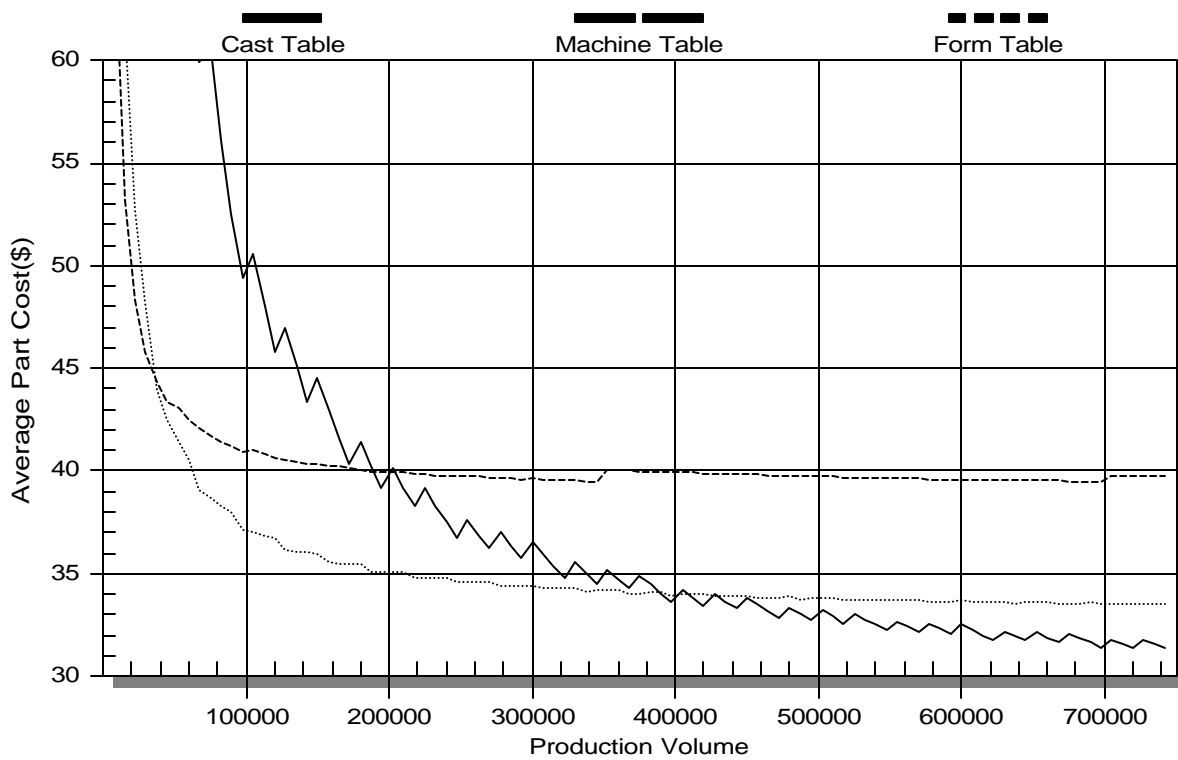


# Manufacturing Process Alternatives for RCM

Resource	Production Process		
	Machining	Casting	Hot Working
Equipment Cost (\$)	200,000	2,000,000	400,000
Material (\$)	30	10	25
Labor cost (\$/hr)	20	100	23
Fixture cost (\$)	20,000	400,000	60,000
Perishable Tooling Cost (\$)	2	0	0
Cycle Time (min)	15	1.5	5

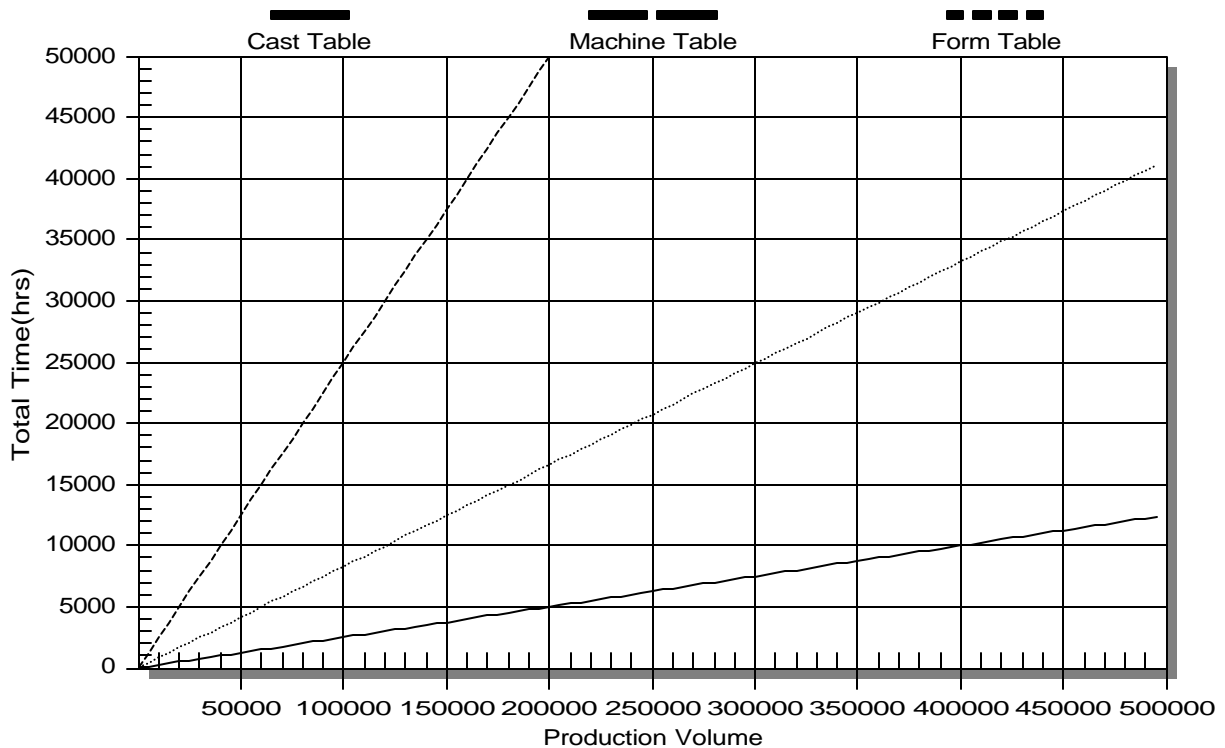
# Average Cost Results

Average Part Cost(\$) vs Production Volume  
Proj= Shaker Table Manufacture , for Selected Alternatives



# Total Time Results

Total Time(hrs) vs Production Volume  
Proj= Shaker Table Manufacture , for Selected Alternatives



# Results

# Conclusions

- *CES and RCM each have unique strengths*
- *Not a complete solution*