

Homework Solutions

13.8

a) Machine Flexibility

1. Refers to the capability of a machine to perform a variety of operations on a variety of a part types and sizes.
2. Universe of part types that the machine can produce.
3. Ease with which parts are changed from one type to another.

b) Routing Flexibility

1. Parts can be manufactured or assembled along alternative routes.
2. Is possible only if manufacturing operations are available on multiple routes.
3. Used to manage internal changes occurring from breakdowns, failures etc.

c) Mix Flexibility

1. Also known as process flexibility
2. Capacity to absorb changes in the product mix.

13.16

Two machine robotic cell

$\mu = 2 * \text{Robot gripper pick up} + 4 * \text{Robot move time}$

$0.2 * 2 + 4 * 0.3 = 2.0 \text{ minutes}$

$\mu \leq \max(\text{Processing time on M1}, \text{Processing time on M2})$

$\max(20, 10)$

T2 is optimal

$T2 = \alpha + \max(\mu, a, b)$

= $2.4 + 20 = 22.4$ minutes is the optimal cycle time.

7.4 Various types of guidance systems

1. Wired
2. Inertial
3. Optical
4. Infrared
5. Laser
6. Teaching type

7.11

1. Flexibility
2. Reliability
3. Operational savings
4. Needed for FMS/GT

If problem 7.10 is required, look at page 275 of your text.