



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Re-accredited by NAAC with 'A+' Grade

Approved by AICTE, New Delhi, Recognized by UGC & Affiliated by Anna University, Chennai
Coimbatore-641035



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

19EET301 / POWER ELECTRONICS AND DRIVES

III YEAR / V SEMESTER

UNIT – IV : A -INTRODUCTION TO ELECTRIC DRIVES



THERMAL LOADING OF A DRIVE & CLASSES OF DUTY



TOPIC OUTLINE



What we'll discuss?

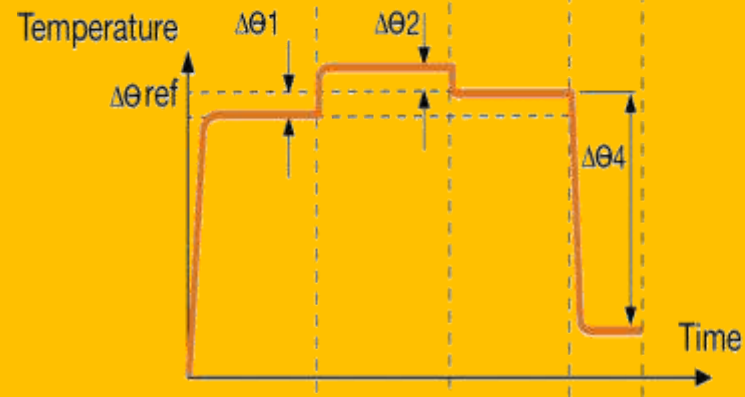
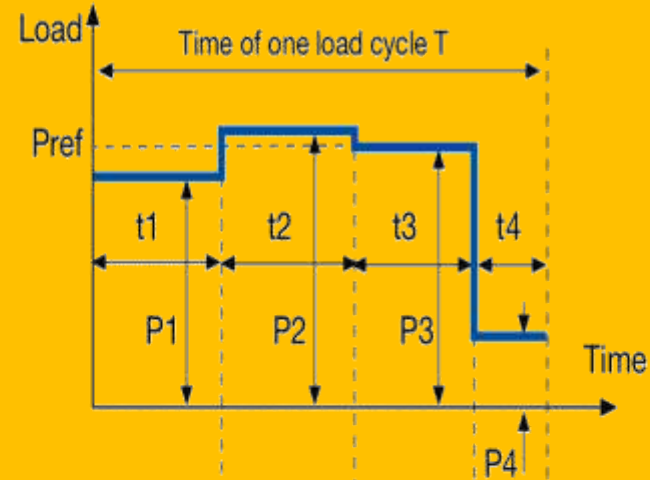


- Thermal loading
- Classes of duty
- How to choose a motor for particular application – A case study.



THERMAL LOADING

- Input Power = Output Power + Total Losses
- Losses transfer as Heat
- **Thermal Loading:**
Temperature rise has direct relationship with Output power
- Temperature rise depends on Classes of duty
- **Classes of Duty:** Categorization of load variation with time





CLASSES OF DUTY



1. Continuous duty
2. Short time duty
3. Intermittent periodic duty
4. Intermittent periodic duty with starting
5. Intermittent periodic duty with starting and braking
6. Continuous duty with intermittent periodic loading
7. Continuous duty with starting and braking
8. Continuous duty with periodic speed changes

Two graphs: (i) Load torque Vs Time
(ii) Temperature rise Vs Time



1. Continuous Duty

- Motor is running long enough
- Motor temperature reaches the steady state value

Eg:

- Paper mill drives
- Compressors
- Conveyors



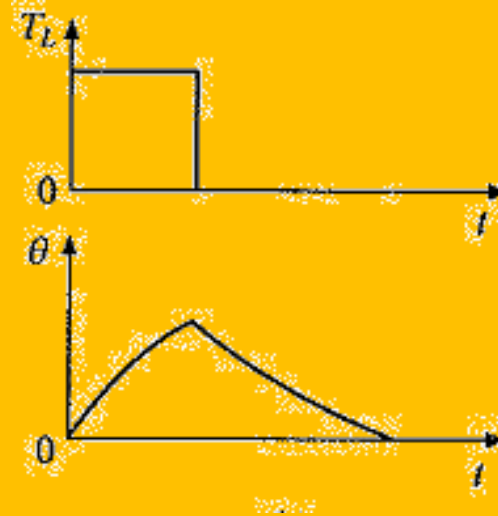


2.Short time Duty

- **High torque operation**
- **With short duration**
- **Heating time is much lower than the cooling time.**

Eg:

- Crane drives
- Hoist drive
- Valve drives

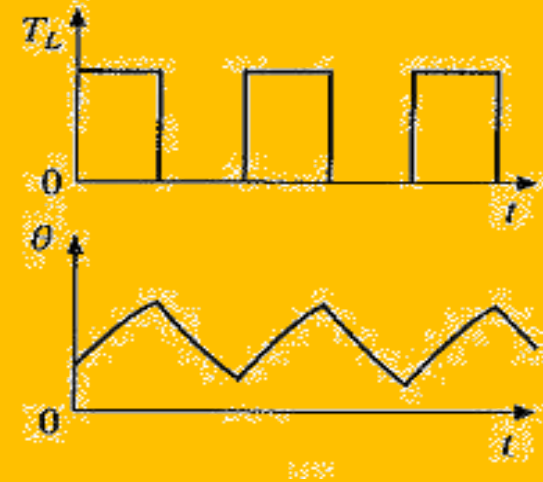




3. Intermittent Periodic Duty



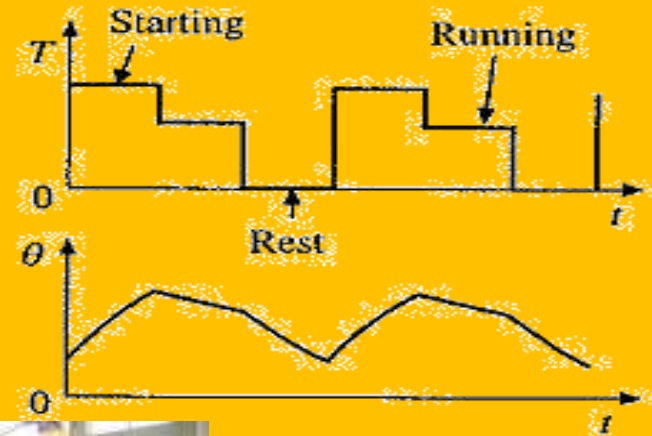
- **High torque with rest period**
- **Time is insufficient to raise the temperature to steady state**
- Eg:
- Press,
- Drilling machine drives





4. Intermittent Periodic Duty with starting

- **Period of starting, running and rest**
- **There is a heat loss at starting, then running period and rest period**
- This motor duty class is widely



- Eg:
- Metal cutting
- Drilling tool drives
- Mine hoist
- Fork lift truck

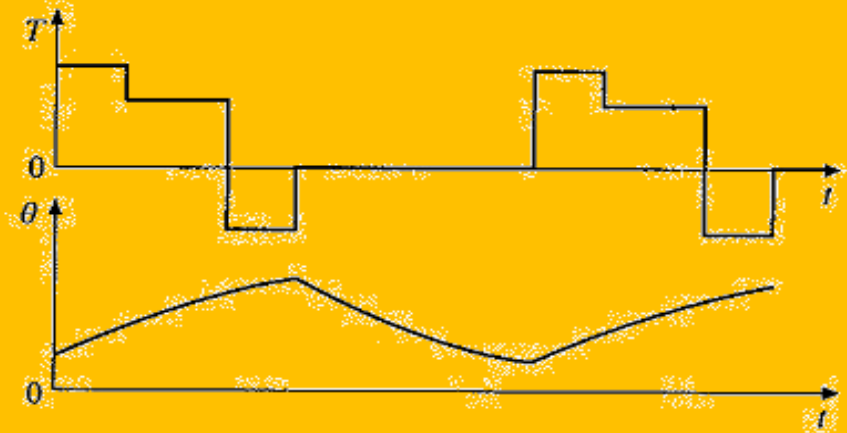




5. Intermittent Periodic Duty with Starting and Braking



- Heat loss during starting and braking cannot be ignored
- Starting period, operating period, braking period and resting period
- All the periods are too short
- Eg:
 - Machine tools
 - Sub urban Train
 - Manipulator Drive



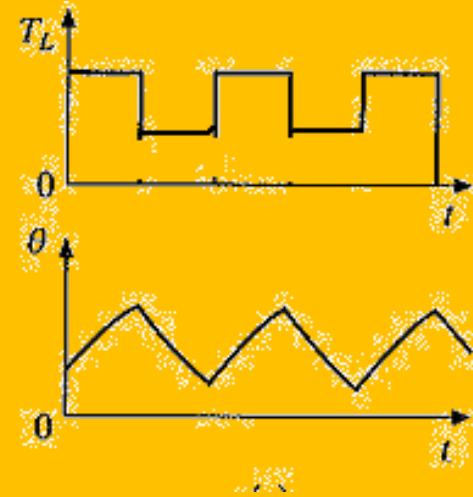


6. Continuous with periodic loadings

- Same as the periodic duty but here a no load running period occurs in between

Eg:

- Pressing
- Cutting
- Shearing
- Drilling





Continuous Duty with different speeds



- Different running periods at different loads speeds
- No rest period
- All the periods are too short



A Case Study



- ✓ [How to choose an electric motor for a particular applications :](#)
- ✓ <https://www.groschopp.com/video/how-to-choose-an-electric-motor-case-studies/>



QUERIES / DISCUSSION



- Recall...

Thank you