



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF AEROSPACE ENGINEERING

19AST101 – INTRODUCTION TO AEROSPACE ENGINEERING I YEAR II SEM

UNIT-III GAS DYNAMICS

TOPIC: Thrust Augmentation

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AIM

Aim of this presentation is give a brief introduction about the thrust augmentation in gas turbine engines.



What is thrust augmentation?



Theory

- $$T = \frac{w}{g} \times [V_2 - V_1]$$

T = Thrust

w = Weight per unit time of air flow

V_2 = Exhaust Air speed

V_1 = Inlet Air Speed



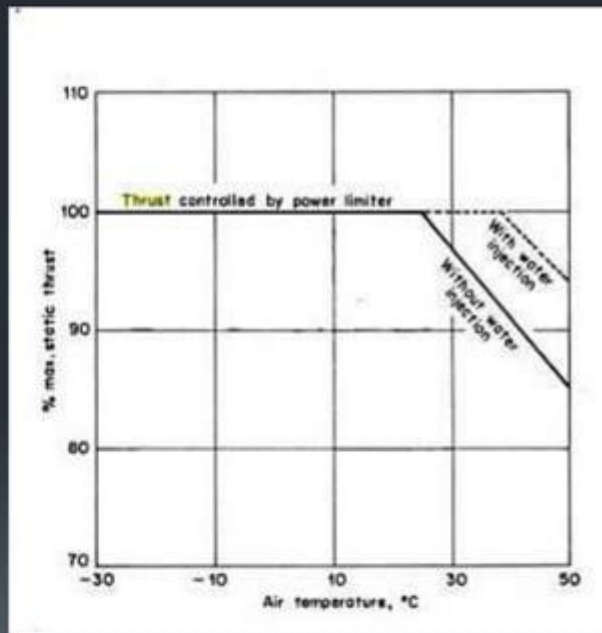
Methods of thrust augmentation

- Water Injection
- After Burning
- Air Bleed off



Water Injection

- Done by increasing weight of air flow passing through engine.
- Boosted 10% - 30% of thrust
- Mixture of De mineral water and Alcohol





Place of the Water Injection

- Front of the Compressor
- Added to the Diffuser



- W_a and W_f are the causes to increase fuel flow.
- Disadvantages
 - very heavy
 - Thermal shock to the engine
 - Compressor blade can be effect on erosion.
- Generally water air ratios are
 - 1-5 lbs. of water to 100 lbs. of air.





AFTERBURNING





- Use in Turbo Jets and Turbo fan engine types.
- Periodically increase in thrust.
- Much similar to Ramjet operation
- Principle of Afterburning is increasing exit air velocity.
- Cooperated with variable area exhaust nozzles.

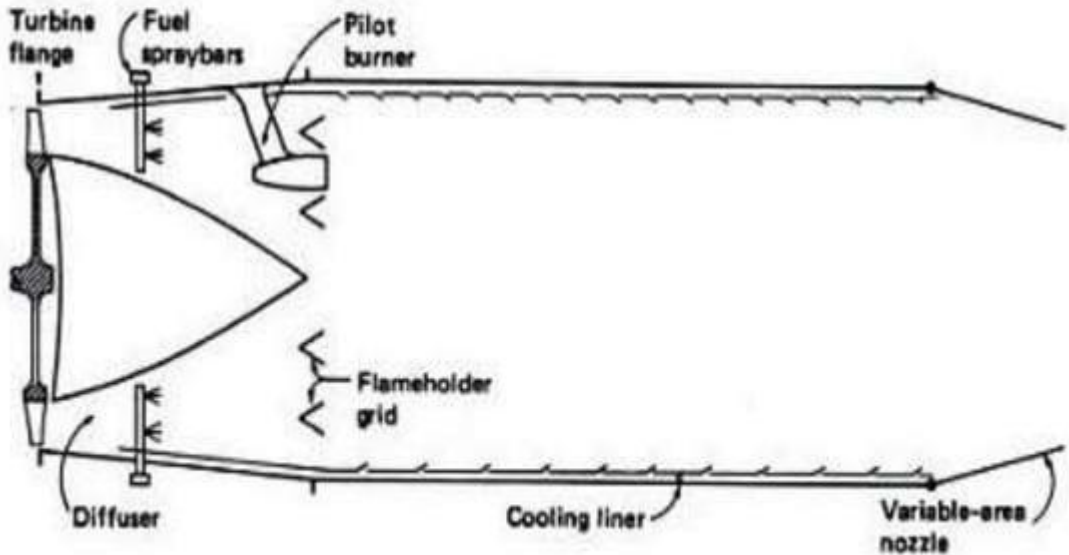


Specific Requirements

- Large Temperature Rise
- Low Dry Loss
- Wide Temperature Modulation



Construction



(a)



Construction cont....

- Afterburner fuel pump
- Afterburner fuel control
- Pressurization valve
- Spray nozzles or Spray bars
- Ignition system
- Flame hoders
- Variable exhaust nozzle
- Connections
- Screech liner



Ignition Systems

- Hot Streak ignition
- Torch ignition
- Electric Spark ignition



END