



SNS COLLEGE OF TECHNOLOGY

AN AUTONOMOUS INSTITUTION



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DEPARTMENT OF AGRICULTURAL ENGINEERING

COURSE CODE & NAME: 19AGT301 & HEAT POWER ENGINEERING

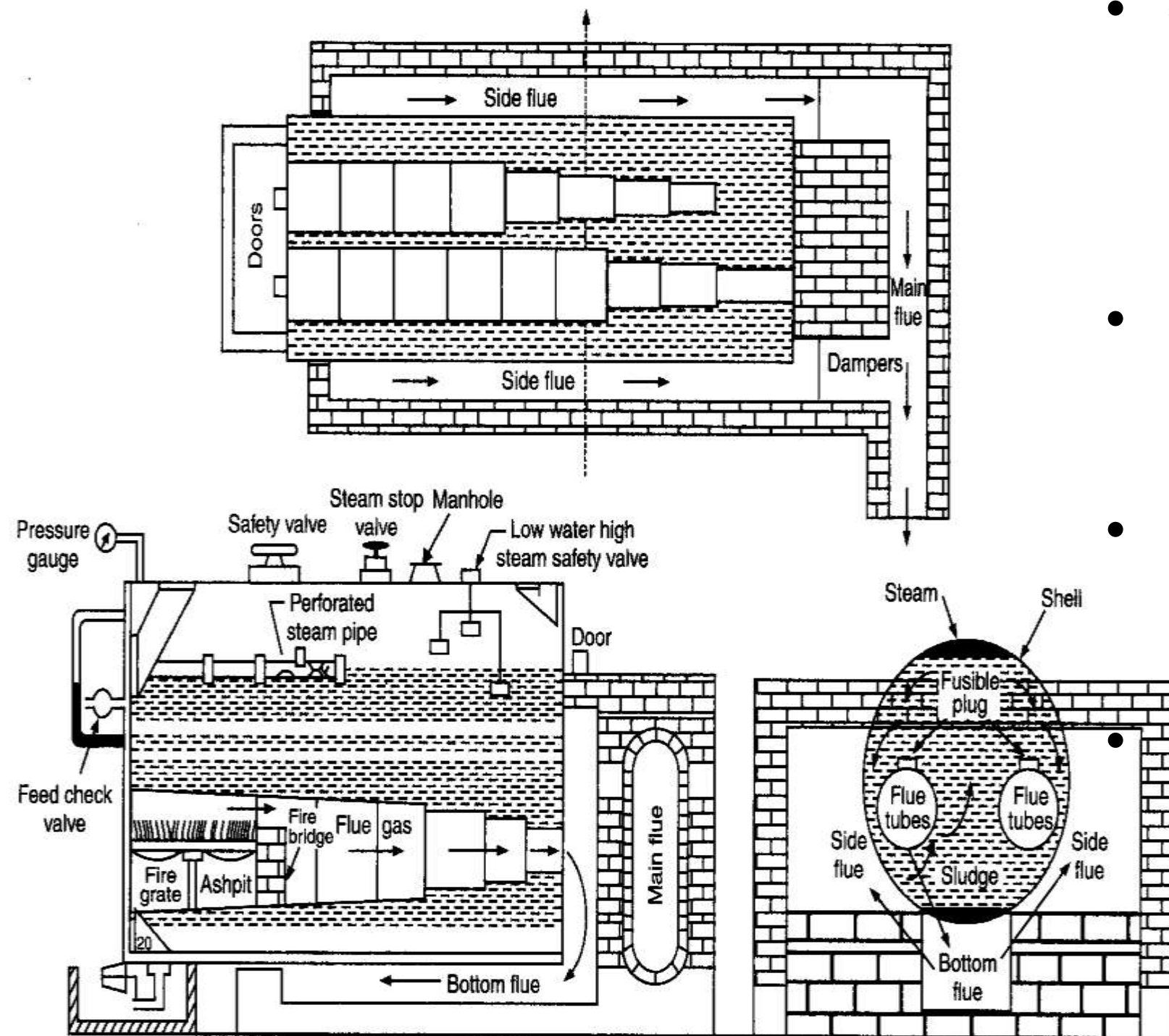
III YEAR / V SEMESTER

UNIT : V BOILERS

Topic : Locomotive Boilers



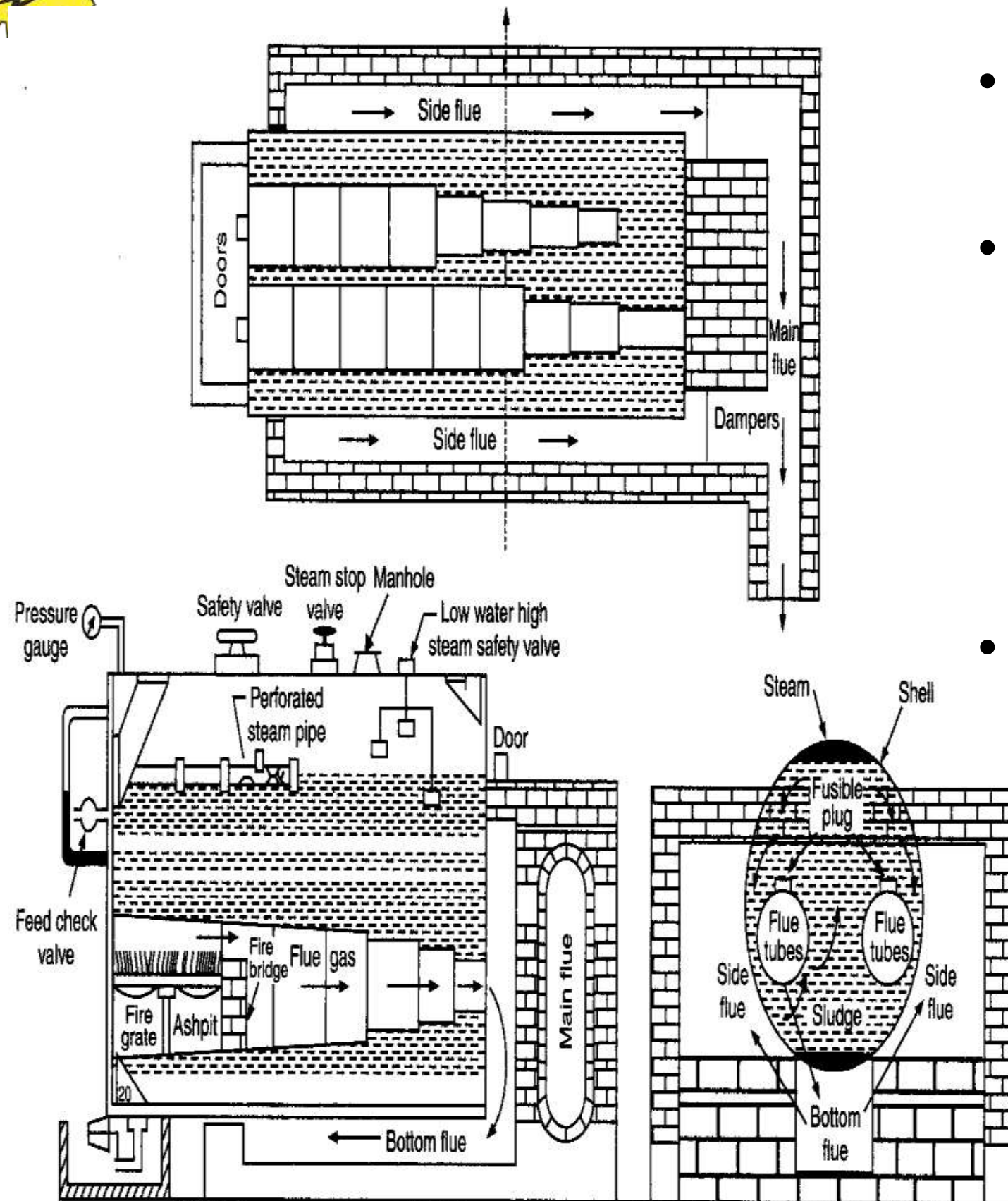
LANCASHIRE BOILER



- Internally fired, horizontal, natural draught and natural circulation type boiler.
- Diameter of tubes is 0.4 times the diameter of shell.
- Each flue tube has its own furnace with grate of about 2 met. Length. Dampers are placed in the path of the flue gases to regulate gas flow and air inflow. Openings are made in the boiler for inspection.



LANCASHIRE BOILER (Working)



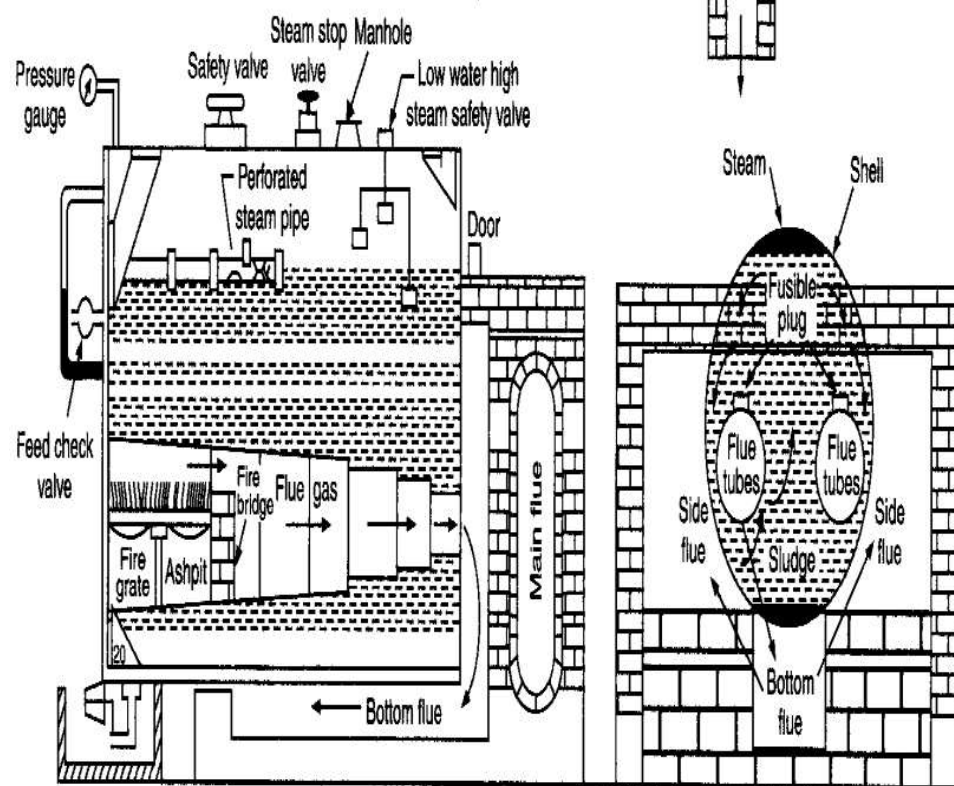
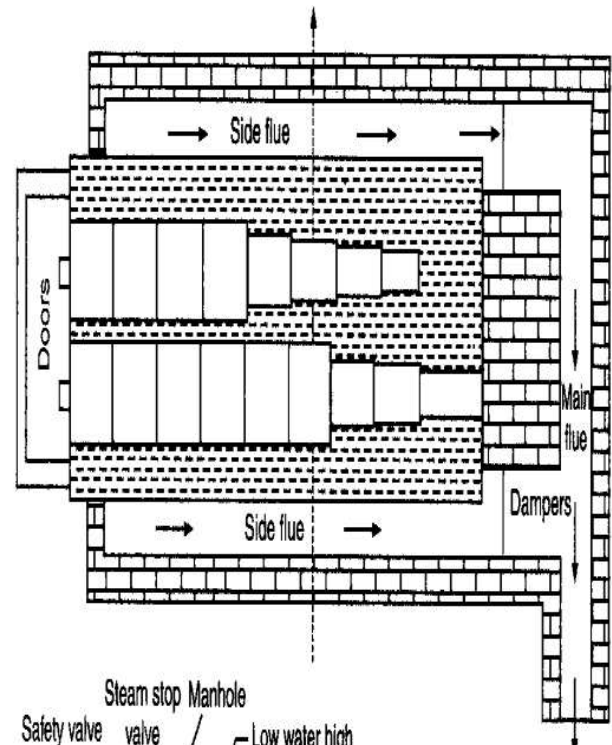
- Flue gases traverse along the horizontal path.
- To the rear end → bottom common flue → travel back to front of the boiler → bifurcate → pass into the two sides → discharge to the atmosphere through chimney.
- Perforated feed pipe controls the feed water → boiler strongly heated → steam generates → generated steam contains water particles → water particles remove by passing through antipriming pipe → steam taken to stop valve to supplied to steam engine.



LANCASHIRE BOILER

(Capacity and Utility)

- Made to withstand working pressure up to 20bar.
- Evaporative capacity 8000 kg/hr.
- Heating surface: grate area 24:30
- Shell size ranges from (2m diameter x 6m length) to (3m diameter x 10m length)
- Widely used in sugar mills, chemical plants, power systems, process works.





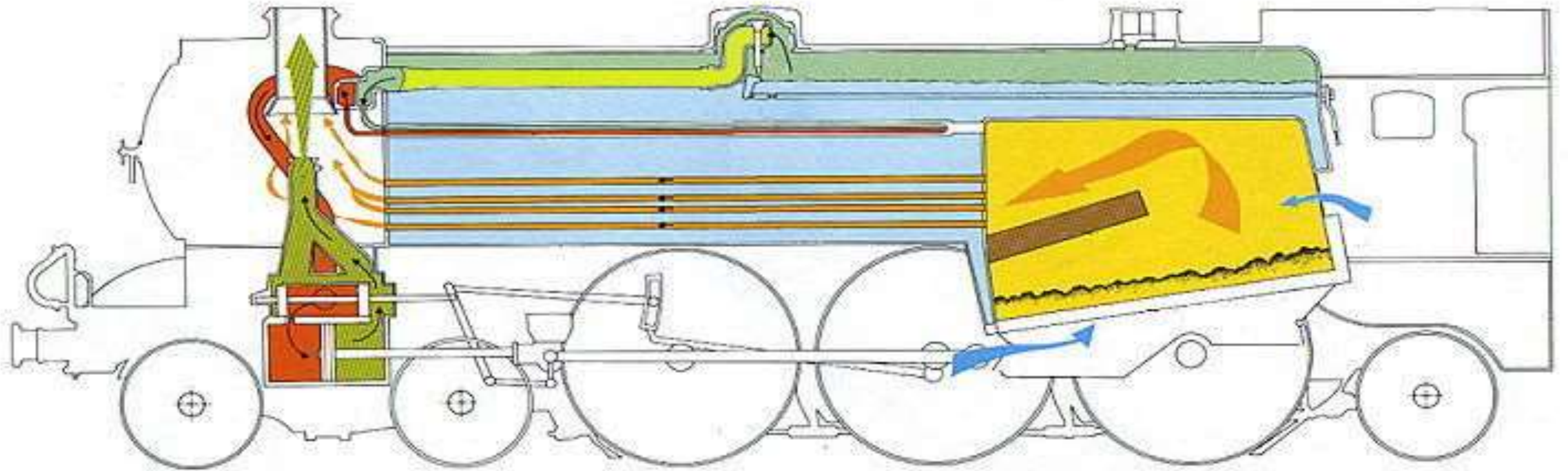
LANCASHIRE BOILER



S.No	Advantages	Disadvantages
1	Simplicity of design	Maximum working pressure is limited to 20 bar.
2	Good steaming quality	More floor area is required due to brick work setting.
3	Can burn coal of inferior quality	Cracks in setting due to large temperature difference inside and out side.
4	Easy to clean and inspect	Restricted grate area due to furnace being inside
5	Less maintenance and operating cost	More time taken for developing steam pressure due to large water capacity.
6	Stand against sudden heavy demand for considerable time without appreciable pressure drop.	

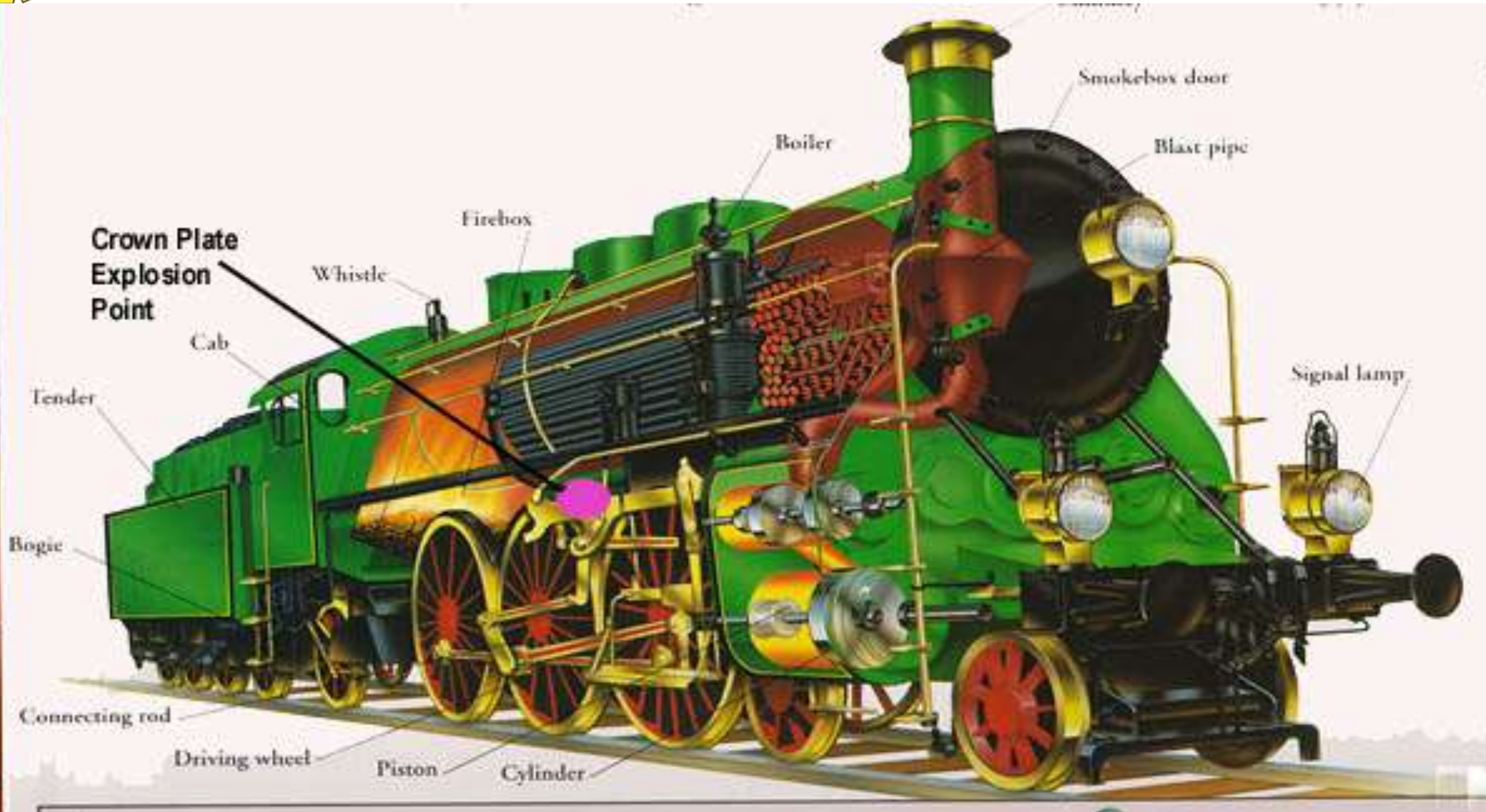


LOCOMOTIVE BOILER





LOCOMOTIVE BOILER



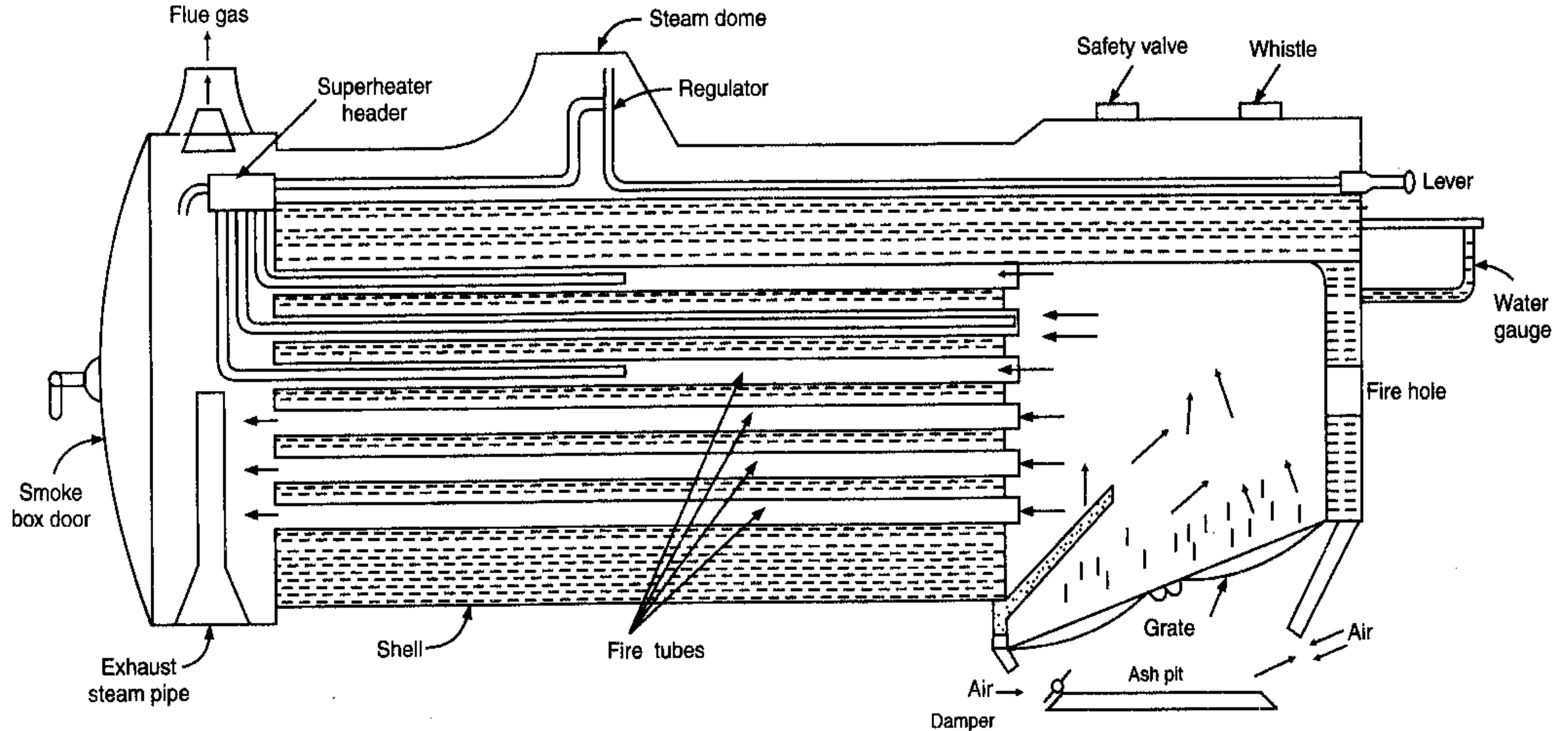


LOCOMOTIVE BOILER



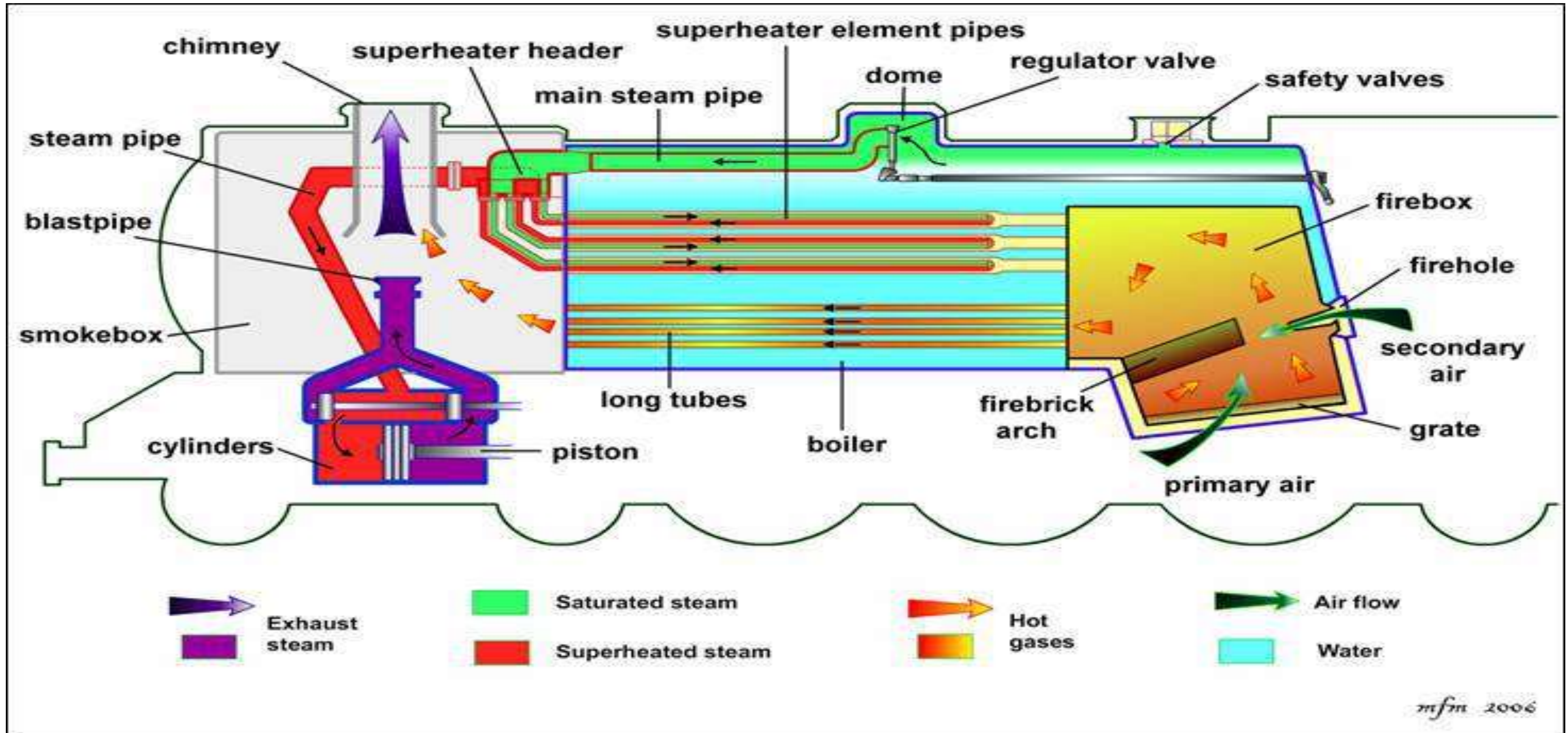


LOCOMOTIVE BOILER





LOCOMOTIVE BOILER





LOCOMOTIVE BOILER



Internally fired, horizontal, multitubular, natural circulation, artificial draft fire tube type portable boiler.

- **Dimensions and specifications:**

Length and diameter of barrel	: 5.203m and 2.095m
Size and number of super heater tubes	: 14 cm and 38
Size and number of fire tubes	: 5.72 cm and 116
Working pressure and capacity	: 14 bar and 9000 kg/hr.
Heating surface and grate area	: 271m ² and 4.2 m ²



LOCOMOTIVE BOILER

(Utility/ Application)



- The locomotive boiler is so designed that it is capable of meeting sudden and fluctuating demand of steam, which may be imposed due to variation in power and speed.
- Uses in railways, road rollers etc.
- Also used in agricultural fields, saw mill plants and stationary power services where semi- portability is desired.



LOCOMOTIVE BOILER



Advantages

Disadvantages

Large rate of evaporation (55 to 70 kg/sec) per sq. met. Of heating surface.

Incapable of meeting very high overloads because of danger of being damaged due to overheat.

Freedom from brickwork, chimney and special foundations, which reduces the cost of installation.

Max. steam pressure is limited to 20 bar.

Reasonable low cost and compactness makes it ideal for portable unit.

Leakage occurs frequently at the place where the tube joins the plate.

Large flat surface needs bracing

Accumulation of mud particles in water lags cause scale formation.



Thank You