Marine Exhaust Systems
What are we going to learn in this lesson?

• Describe the operation of dry and wet exhaust systems.
• Identify the types and operation of marine mufflers.
• Identify the characteristics of a good marine exhaust system.
Reading Assignment:

• HBTW, pp. 35-40
Exhaust Systems

- Dry Exhaust Systems
- Wet Exhaust Systems
Dry Exhaust Systems

• Not typically found on recreational boats.
• More likely found on commercial (e.g., lobster) boats or other limited applications.
• Simpler, but noisier (no contraction of exhaust gases from water injection).
• No need to winterize exhaust system.
• Permits year-round operation when combined with closed-circuit cooling.
Water Cooled ("Wet") Exhaust Systems

- Typically found on recreational boats.
- Water injection quiets exhaust
- (Can) Eliminate the need for insulated exhaust piping
Wet Exhaust System Options

- Water cooled exhaust manifolds
- Water cooled exhaust risers
- Water cooled exhaust elbows
Muffler Options

• In-Line

• Water Lift

• Water Drop
In-Line Mufflers
In-Line Exhaust with Surge Tube
Water Lift Mufflers
Water Lift Muffler

Diagram showing the components of a water lift muffler, including:
- Engine
- Exhaust manifold
- Hose clamps
- Rubber hose
- Flexible pipe
- Overboard discharge
- Water-lift muffler

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Water Lift Exhaust System

- Below water line application
  - Manifold
  - Water mixed with exhaust

- Anti-siphon loop
- Lift muffler
- Exhaust and water exit
- Waterline
Water Drop Mufflers
Water Drop Exhaust System

FIG. 1
Exhaust Hose Routing

- Down angle (slope)
- Rise out of water lift mufflers
- Check valves
- Manual Valves: DON'T!
Exhaust Outlet Location

- Transom
- Hull Side(s) Aft
- Underwater Exhaust
External Check Valve (Flapper Valve)
Internal Check Valve(s)
Underwater Exhaust Outlet Piping (PC)
Underwater Exhaust Outlet (SR, MI)
Exhaust System Noise/Vibration

• Isolation

• Bellows (or Hump) Hose Connections

• Soft mounts for mufflers (especially in-line)
Bellows (or Hump) Hoses
Genset Muffler (SCD1)
Generator Exhaust

• Separate outlet from main engines (required by ABYC on gasoline systems)

• Allows operator to check water flow

• Minimizes possibility of carbon monoxide poisoning
Exhaust Back Pressure

- *Primary indicator of exhaust system performance!*

- Allowable system back pressure is specified by the engine manufacturer

- Back pressure specified in psi (or psig), inches of mercury (head) or feet of water (head)
Exhaust Elbow Schematic
Volvo MD-71 SS Exhaust Elbow
Exhaust Elbow with Flex Connection (SR, MI)
Exhaust Run (SR, MI)
Exhaust Elbow Supports (SCD2)
Muffler (SCD1)
Next Week:

Lubrication

Reading Assignment:
HBTW, pp. 33-34