Time:

Carbon Monoxide Hazards

Key Concepts:

Main Teaching Points:

1) **Discuss the importance to raise the awareness of possible deadly circumstances effecting boaters- Carbon Monoxide poisoning.**

2) **Review signs and symptoms of high an low levels of carbon monoxide poisoning:**
   a) low levels (10%) – symptoms commonly mistaken for cold and flu symptoms. Shortness of breath, mild exertion, mild headaches and nausea.
   b) Higher levels (30%) – symptoms more sever: dizziness, mental confusion, sever headaches, nausea fainting and mild exertion.
   c) High Levels (50%) unconsciousness and death.

3) **Review possible conditions where carbon monoxide might be a danger.**
   a) while underway,
   b) cooking and heating—use appliances under well ventilated conditions only.
   c) or at idle for too long – particularly enclosed spaces / partially enclosed spaced.

4) **Discuss ways to be alerted to CO build up.**

5) **Discuss examination criteria relating to CO hazards**
   a) look for after market changes or modifications to vessels– cabin extensions, canvas tops changed.

6) **Discuss likely situations where exhaust gases may billow up and drift** into enclosed / partially enclosed spaces.
   a) exhaust from an other vessel
   b) iding or at slow speeds
   c) blockage of exhaust outlets
   d) backdrafting

Rationalization: *What you can't see would hurt you…it may kill you*! *Carbon Monoxide may build up within, alongside or behind your vessel in minutes.*

Notes

Quick Points

	CO awareness
	Signs and Symptoms
	Conditions where CO may be a danger
	Alerts to CO build up.
	Examination criteria
	Common Sources
	What to do

Instructors Note:
Provide students with CO hazards handouts.
(OHD) using an over head to develop a point
(HAND OUT) exercises or information on sheets
(CLS EX) class exercise

Problem Sources:
Transom exhaust, swim platforms, houseboats, generator exhaust and four stroke engines (there is still as much Co2 , but less smoke)

CO is the leading cause of accidental poisoning deaths.

TREATMENT
- Decontamination- remove from source.
- Oxygen therapy- Non-rebreather mask at 100%
- Hyperbaric chamber.

Page numbers linked to text Office of Boating Safety Website http://www.tc.gc.ca/BoatingSafety/news/co2.htm

Suggested Activities:
Use handouts, photos and overheads with pictures of aftermarket changes or modifications to vessels.

- cabin extensions,
- canvas tops changed

Have students identify likely spaces where exhaust gases may billow up and drift into enclosed / partially enclosed spaces.

Talk about case studies of incidents where exhaust gases billowed up and drifted into an enclosed or partially enclosed space. What steps could have been taken to avoid the build up of CO?

- educate passengers
- visual inspection of exhaust components
- listen for changes in exhaust system that could indicate system failure
- test operation of CO detectors (batteries)
- annual checks hoses, water pump impeller, metallic exhaust components.

Bonus Question: What is the most common source of carbon monoxide poisoning?
Answer: Leaks in the exhaust pipe fitting of a gas generator.

Method of Evaluation & Condition	***Skill / Knowledge and Standard***
Skill	
Each candidate can be evaluated for these points by written examination or oral questioning during vessel examination.	Each candidate shall look for after market changes or modifications to vessels– cabin extensions, canvas tops changed. Each candidate shall ID likely spaces exhaust gases may billow up and drift into enclosed / partially enclosed spaces
Knowledge	
Each candidate can be evaluated for these points by written examination or oral questioning during vessel examination.	Each candidate shall be able to explain the possible conditions where carbon monoxide might be a danger. i.e. while underway, cooking, heating or at idle for too long – particularly enclosed spaces / partially enclosed spaced. Each candidate shall be able to explain the signs and symptoms of carbon monoxide poisoning. Use appliances under well ventilated conditions only. Carbon monoxide detectors alert to CO build up