

CONSIDERATIONS FOR WATER BORNE INFRASTRUCTURE

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VERTICAL LIFT AND MARITIME ARE BEST BUDDIES



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Traditional Use Case



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Flexible Use Cases



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This then becomes the question



What About This?

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LANDING FACILITIES ON SHIPS CAN BE EASY, OR NOT

- American Bureau of Shipping (ABS) Rules for HELICOPTER DECKS AND FACILITIES
- Covers touch and go
- Covers full service including refueling
- Rules can be used for design guide and for classification
- Each Classification Society has its own rules, but they are substantially similar
- A ship is part of the country of the flag it flies
- USCG has no problem with helicopter facilities on US Flag vessels
- Other flag states care even less.

SO WHAT IS A SHIP?

- It can get complicated
- Generally requires a lawyer, but a ship is something that carries cargo or people between places.
- There are International and domestic vessels.
- In international trade, international standards apply such as SOLAS, MARPOL and SMS and design is complicated but clearly regulated.
- Domestic vessels can be many things.
- If navigable water the vessel is under USCG control and may require all types of design features.
- If it is a private yacht (no passengers for hire or cargo) you can actually make it as big as you want, and you can build anything you want. You need life jackets and some other safety stuff, but that is basically it.
- If you have less than 6 paying passengers, the design of the vessel is also not governed by USCG requirements.

DOMESTIC, MORE THAN 6 PASSENGERS

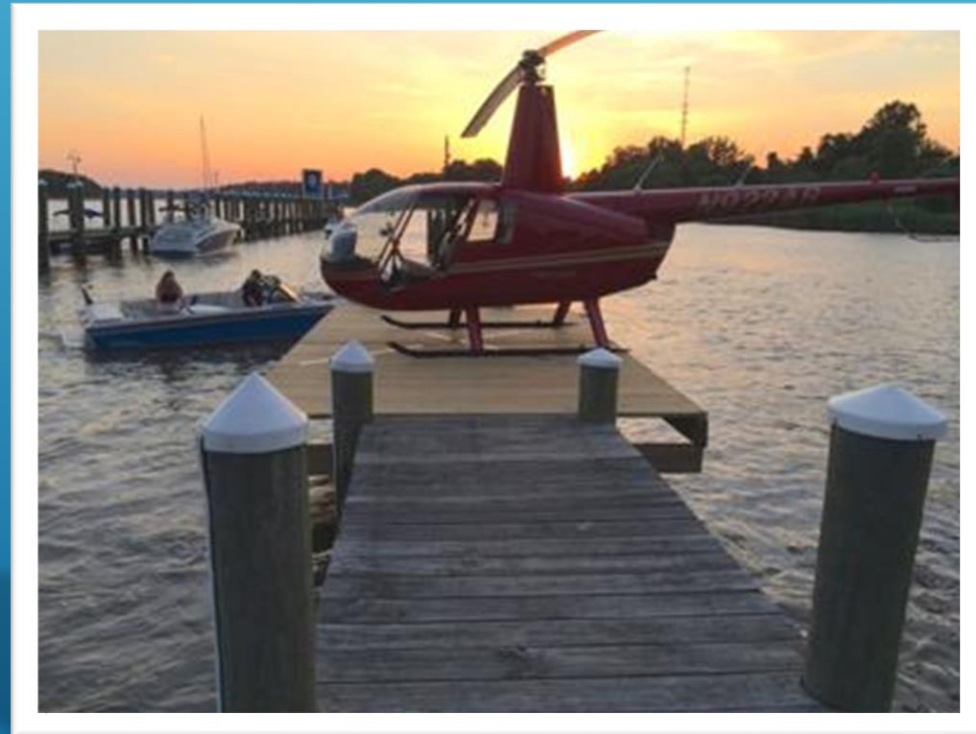
- USCG Code of Federal Regulations apply
- Less than 149 passengers Subchapter T (CFR 46 CFR 175.110)
- Somewhat larger vessels Subchapter K (CFR 46 CFR 114.110)
- Large Oceangoing Vessels Subchapter H (CFR 46 CFR 70.05-1)
- Helicopter facilities? Use Class rules
- Is a landing barge a passenger vessel?
- A barge is a passenger vessel if there are more than 6 paying passengers aboard at any one time.

NON-NAVIGABLE WATERS

- If there is no route to the sea it is generally non-navigable
- That makes them state waters
- Lake George is non navigable, Lake Champlain is navigable
- The state can restrict flight ops on lakes (Adirondacks)
- Some states have passenger vessel requirements and inspections (New York)
- Some states have no idea what that means (Oklahoma)

SOME OPTIONS FOR STATIC MARINE LANDING FACILITIES

1. Never have more than 6 passengers on the marine facility.
2. Full USCG approved US flag vessel with an approved helicopter facility.
3. A Barge tied up somewhere
4. A Barge anchored somewhere
5. A pier
6. A platform
7. A foreign flag vessel?



6 PASSENGER MARINE FACILITY

- Never have more than 6 passengers on the marine facility.



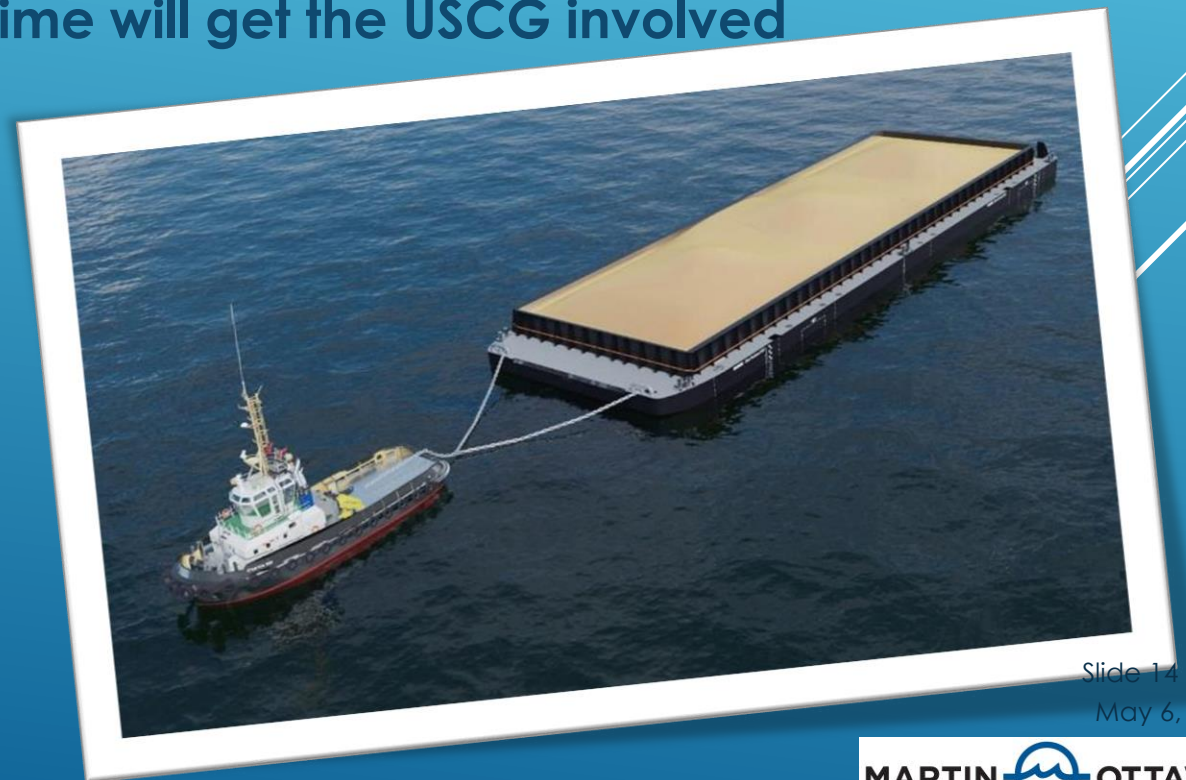
ACHIEVING A FULL USCG APPROVED VESSEL FACILITY

- \$\$\$\$\$\$\$\$
- USCG approved design
- USCG inspected construction
- USCG licensed personnel
- Periodic drydock inspections
- It cannot be permanently tied up, or it becomes something else



A BARGE TIED UP SOMEWHERE

- How to tie it up? Spuds or articulated frame?
- Is the location approved (oysters, permanent floating facility regs)
- More than 6 paying people at any one time will get the USCG involved
- It could be a private facility
- Even if private, local zoning may apply



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A BARGE ANCHORED SOMEWHERE

In theory a vessel can anchor just about anywhere.

In practice there are designated anchorages

Designated anchorages are not permanent anchorages

A permanent anchorage will require federal approval such as USCG, EPA and US Army Corps of Engineers

Boarding design

Need a USCG approved transfer vessel if more than 6 passengers

A PIER

- Piers are nice.
- They are expensive and require local state and federal approval and require private land



A PLATFORM

- Like an oil platform?
- Very little private submerged land
- Can be done, but requires a useful need and Federal approval
- An anchored or spudded barge may be easier



A FOREIGN FLAG VESSEL?

Jones Act issues

USCG has port state inspection rights

PRIVATE AND AUTONOMOUS CHANGES THE GAME

- ▶ If there are no passengers for hire, the Government takes little interest as to where you park your vehicle on the water.
- ▶ Local communities may complain, but on navigable waters you can act as if it is a recreational vessel.
- ▶ At this time there is no defined autonomous vehicle licensing approach. It will happen, but it is unclear how it will work out.
- ▶ In small projects an autonomous or private (personal) VTOL vehicle may very well be able to land on the water under the radar for a while
- ▶ Amphibious VTOLS would operate without a licensed landing facility, and, in theory, can pull up to any random private dock.
- ▶ Some places still are the wild west (like Alaska)

WHO ELSE MAY BE INVOLVED?

- US Army Corps of Engineers (USACE)
- State agencies such as DEP
- Park Services (Federal/State)
- State Governments
- Local Governments
- Local Environmental Groups



SOME DESIGN CONSIDERATIONS

- How big a barge float or ship?
- What service are you looking for?
- Where will it be used?
- How do passengers get onboard?
- When do passengers get onboard?
- On flat water the size is determined by stability
- On exposed waters, talk to the pilot
- Refueling is more complicated on water than on land
- A landing barge can be tiny

CONCLUSIONS

- The USCG is not interested in carrying your risk
- The design is always location dependent
- Under 6 passengers there is little official vessel regulation or oversight
- There will always be complications
- If the locals want a maritime landing facility it is easy, if not, there is very little in the form of regulations to provide support
- KISS, but it rarely is
- Some type of national guide or regulation for Marine landing facilities could be helpful