Consider the Maritime Angle

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In this presentation:

- An unknown path to the middle class
- The maritime industry, what is it?
- What the maritime industry offers to today's students especially in the context of STEM
- How students and teachers can take advantage of the maritime industry

A little bit of disclosure

Great grandfather: Cigar maker (Dutch Master)

Grandfather: Blacksmith and then Ship's engineer

Father: Maritime Academy then to US

Me: Aerospace and Ocean Engineer and still in Marine Industry

Laborer to middle class in one generation through the marine industry.

And this is the norm for centuries and all across the world.

Let's define Middle Class

- Two chickens in every pot and a car in the garage?
- Cradle to grave security?
- $50,000 to $250,000 per year?
- To achieve a level of independence where you can choose your life's path, rather than be forced to pick between unattractive alternatives

In the maritime industry by choice

- Dynamic Industry
- Positive outlook
- Self directed and self determined
- International
- Transferable skill set. My kids learn from me
- Cooperative
- Maritime industry is Maritime trade


WHAT IS MARITIME?

Is History Conquest or Trade?

- Conquest is a temporary condition
- Conquest does not establish sustained wealth
- Government does not establish wealth
- Trade establishes sustained wealth
- Yet education does not teach about trade. It teaches about conquests and governments
- Where should educators direct their student's attentions? Glory or sustainability?

Let's define "Trade"

- It is not Wall Street
- It is not trading baseball cards
- It is not the belief that total free trade will solve all problem
- Trade is the flow of goods
- Maritime trade is flow of goods on steroids
- The flow of goods has changed the world from subsistence societies to the modern world

Modern Worlds

- The Phoenicians
- The Vikings
- The Hanseatic League
- The Portuguese Era of Discovery
- The Spanish Era of Discovery
- The Dutch Golden Age
- The British Empire
- All maritime traders?

What did the Traders Do?

- They used science and technology to make ships
- They made discoveries
- They generated wealth
- The more they focused on trade the more they succeeded
- The more they focused on trade the more their wealth was preserved

And

- The maritime traders created a middle class
- A middle class that was basically self-sustaining
- And non-maritime traders did not manage to create a strong middle class (China, Japan, Russia)
- Why? How?

It's complicated, but ..

- Maritime trading benefits rapidly from technology enhancement
- Maritime trade operates on utmost good faith
- Maritime trade requires deep and transferable skills
- Maritime trade is incredibly efficient
- High dollars per manhour allows high wages

Quick Study Guides:

- The effect of trade: “The Island at the Center of the World: The Epic Story of Dutch Manhattan and the Forgotten Colony That Shaped America” by Russell Shorto
- The efficiency of maritime trade: “The Box”, by Marc Levinson

TRADE IS THE WORLD TODAY AND 99% OF TRADE IS MARITIME

Yeah, but what about the US?

- Take a close look at how this country came together
- Farming, hunting, then what?
- The revolution was about maritime trade
- The war of 1812 was about maritime trade
- And then the country became wealthy along the coasts due to maritime trade

And then

- And then we had an industrial revolution. The Owners became wealthy, the rest went to sweatshops. Labor unrest
- And then we had a civil war about agriculture. Agriculture cannot generate wealth the way industry and trade can, and the South did not think they could compete without slaves

And then

- And then we used our industrial strength and maritime trading ability to dominate the world
- And now, maybe we are losing our industries, but the maritime trade is still here
- We have managed to keep it out of the curriculums, but the maritime industry is still here and still a path to the middle class

Which 20th Century US Presidents had Maritime Backgrounds?

20th Century Presidents

- Teddy Roosevelt. Wrote: The War of 1812, Ass't Secretary of the Navy
- Franklin Roosevelt. Ass't Secretary of the Navy
- John Kennedy. Navy Officer
- Richard Nixon. Navy Officer
- Gerry Ford. Navy Officer
- Jimmy Carter. Navy Officer
- George Bush Sr. Navy Pilot
- Bill Clinton. Taught Admiralty Law

Why are we not making the connection? 1

- The US has zero maritime outlook
- Poor kids used to sit on the docks, ready to get started. Today they don't get to sit on the docks anymore
- Poor kids are not aware of the opportunities in the maritime field
- Poor kids see parents in failing farms and closing factories
- Kids don't know where to start to get into it

Why are we not making the connection? 2

- Most maritime middle class parents send their kids out of the maritime field
- Remember it is “the path to the middle class”, once you get in the middle class you have choices
- Schools and employers are not opening the doors to the maritime industry to the appropriate kids

Maritime Jobs to the middle class?

- Navy (430,000)
- Coast Guard (41,000)
- That's it, right?
- Middle class?

It is not even really the Maritime Industry

- Cargo shipping
- Cargo transfer
- Cargo Storage
- Ship design
- Ship construction
- Ship repair
- Ship operations

and

- Navigation/ship crews
- Weather analysis and forecasting
- Ship brokerage
- Shipping finance
- Shipping insurance
- Shipping economic analysis
- Shipping environmental analysis
- Ship regulatory compliance

and

- Fisheries
- Cruise trade/tourism
- State marine enforcement
- Marine firefighting
- Marine environmental remediation
- Offshore resources (oil)
- Recreational boating industry
- Maritime education

and

- Support. Agency/supplies
- Terminals
- Cargo transfer
- Electronics
- And maybe marine biology and yacht design

and

- Internationally, country to country
- Coastal
- Great Lakes
- Rivers
- And with global warming we'll have more!


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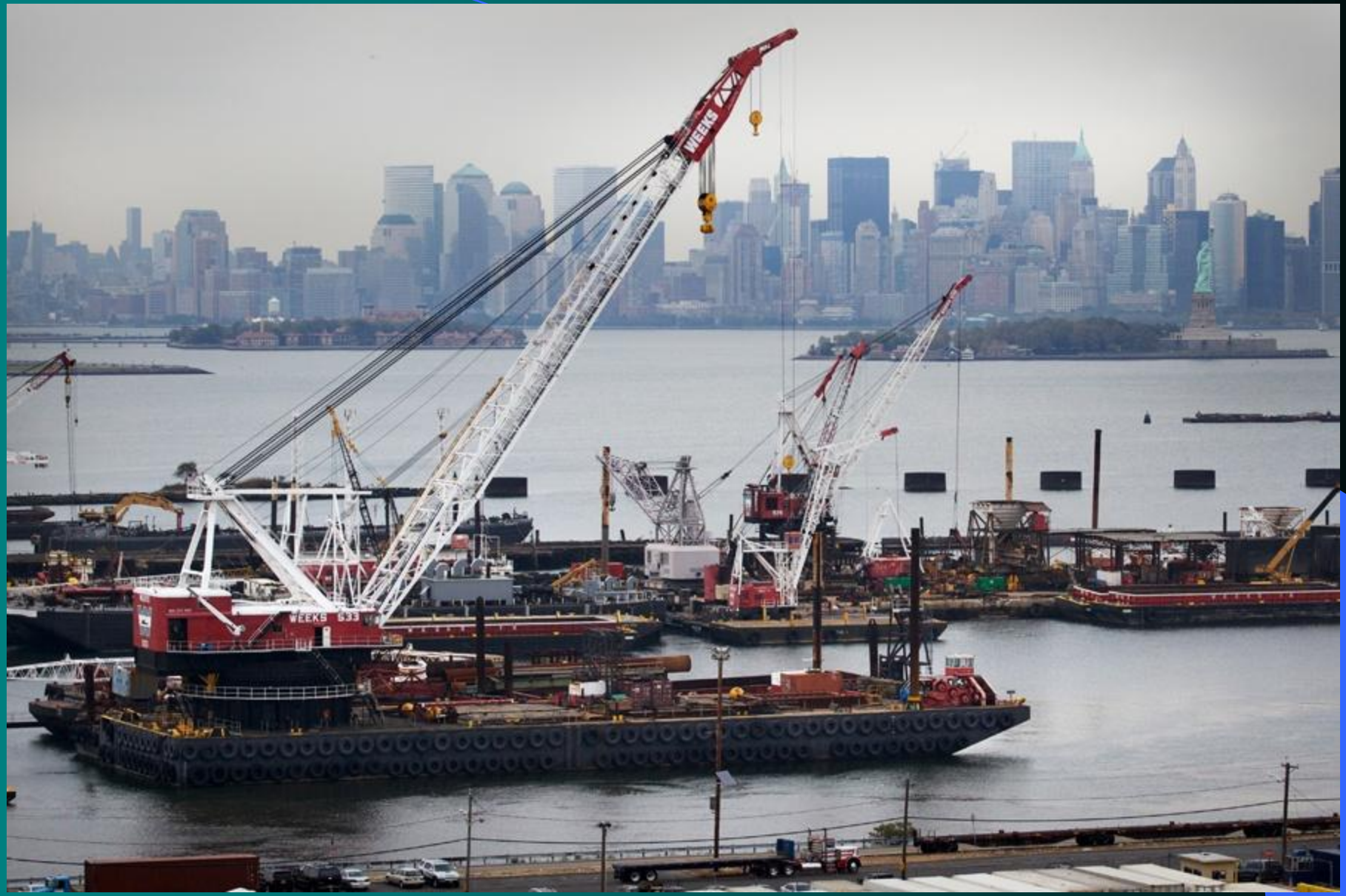
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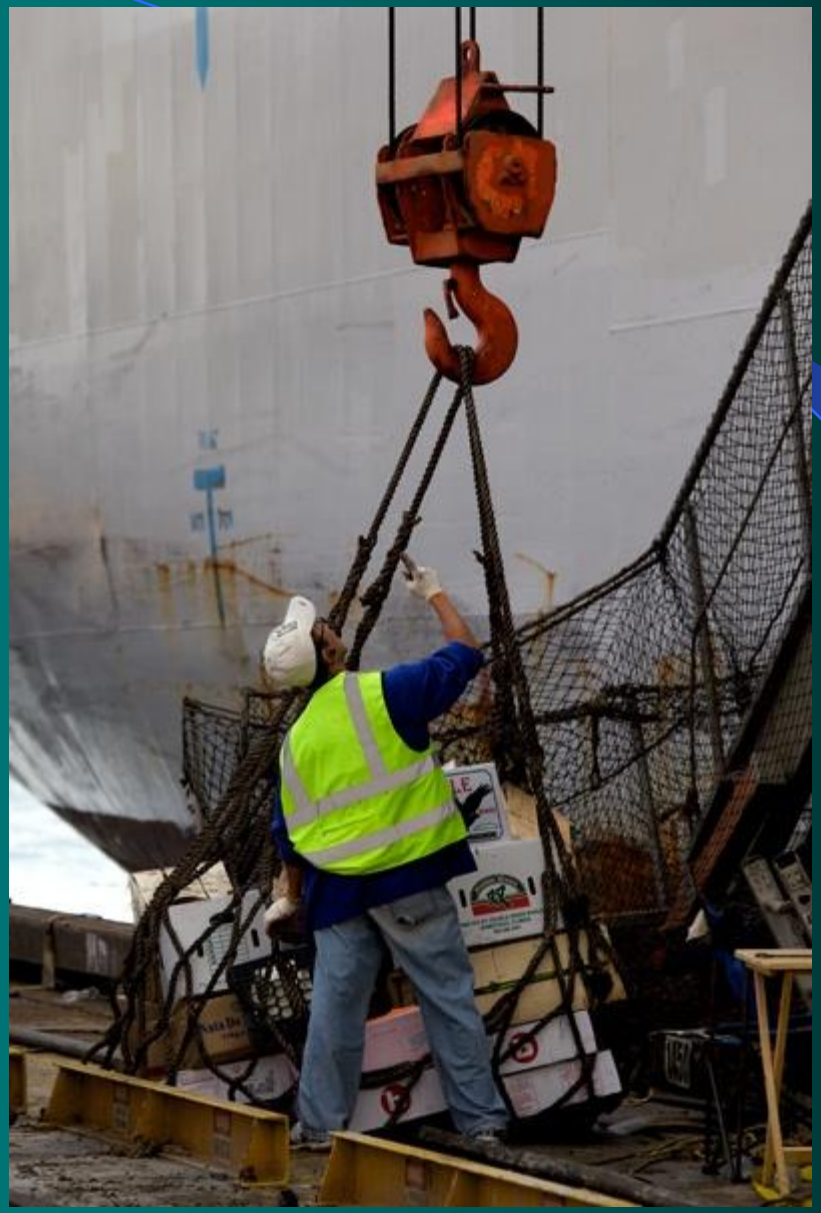

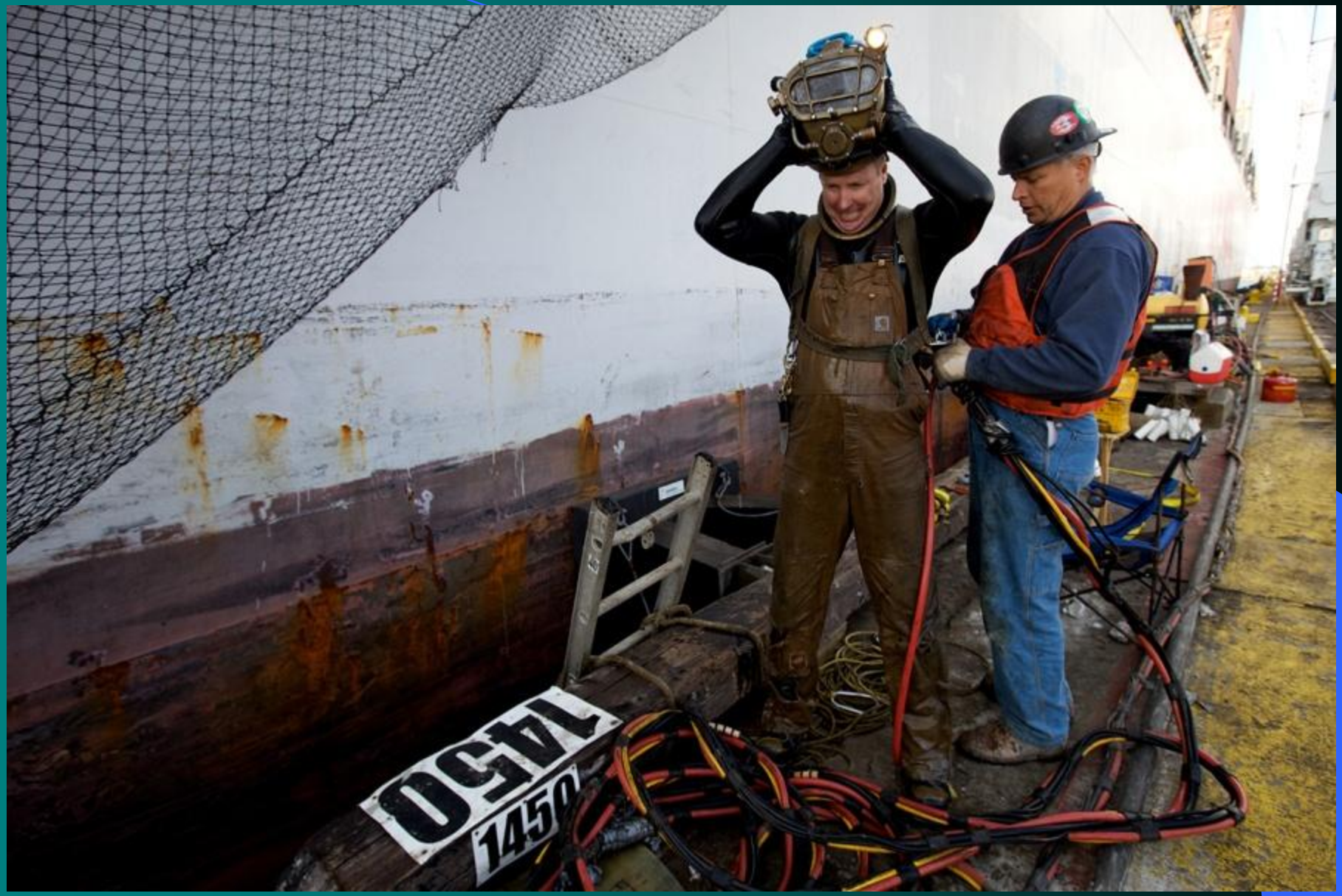
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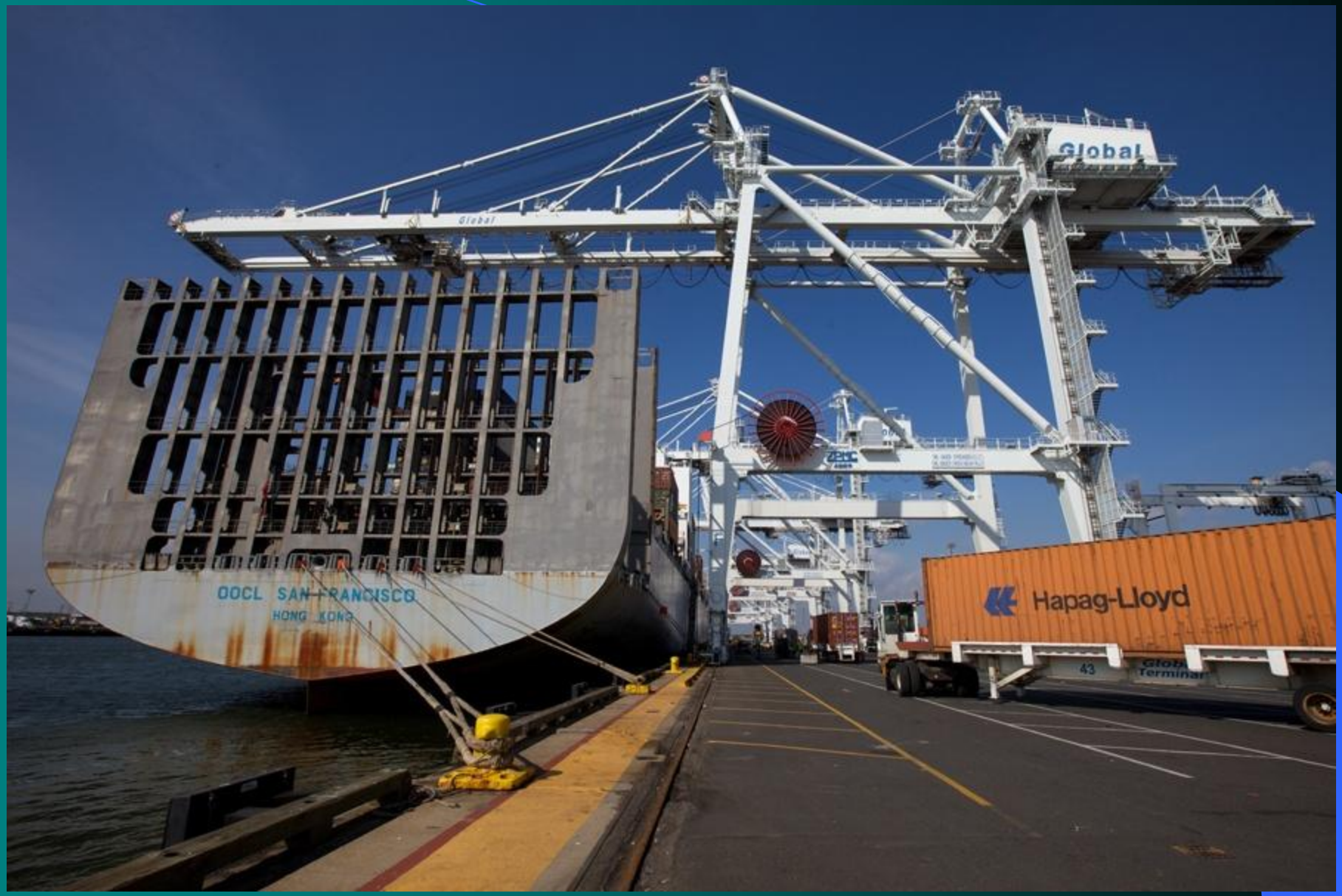
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The Marine Industry

- Somewhere to the tune of 10 million Americans with solid middle class status
- If you work hard and you are flexible, you will be assured of a path to the middle class
- You will advance fast, especially if your STEM skills are strong
- Pay is good
- Education and advancement is CHEAP!

How about 30 years from now?

- The marine industry will still be here
- It is done outsourcing
- Today there is real concern about a lack of entrants to the marine industry …. Internationally!
- Very good jobs in the US are going to foreign nationals
- It is the world's leader in sustainability and environmentalism

LET'S LOOK AT STEM IN THE MARITIME CONTEXT

Maritime STEM

- STEM that applies ashore applies in Maritime
- However, STEM cause and effect in Maritime is extremely direct.
- If I don’t know where the storm is coming from, I die. If my ship breaks, I die
- Maritime has a tremendous amount of unknowns and unknowns enable STEM
- STEM and maritime are made for each other

A Maritime STEM secret

- Rocket science is sandlot compared to maritime engineering
- I am an aerospace and an ocean engineer
- Rockets: air and space constraints; easy
- Marine: water, air, waves, salt, commercial, human and political constraints; complex
- The last set of transportation equations to be fully described? Sailboats in the late 1970's!

Sailboats are the most complex engineering system to design

- Cars move on ground
- Buildings only move in earthquakes
- Airplanes only move in air or on ground
- Submarines move mostly underwater
- Ships moves through water and are influenced by waves
- Sailboats are powered by air, move through water and are influenced by waves

Behold one of the world's most complex technologies

How Fast?

What can K-12 education do?

1. Teach students about maritime, even if they live far from the sea.
2. Use maritime examples in STEM because maritime examples make STEM easy to explain.
3. Gradually and persistently keep the maritime industry on the table as a viable career option.
4. As teachers, spend a few hours learning about maritime; it is fun.

Teach Students

- Make sure they are aware that there is a maritime industry
- Use it in all aspects of education (health, team building, art, music, literature, science)
- Explain that there are tremendous career opportunities for those who want to get ahead
- Distinguish between romance and reality

Teach Students 2

- Focus on those girls and boys who will benefit most (cigar maker, to blacksmith, to ship's engineer)
- Those who have few alternatives
- Make the toughness of the job a source of pride

STEM and Maritime

- Teaching STEM with maritime is easy
- You cannot escape STEM in the maritime environment
- Time, distance, weight, size and cost are central in maritime
- The moment a student is involved in a maritime activity she will have to address STEM issues (canoe trip)

And

- The maritime environment is the ultimate STEM lab
- High level of unknowns
- Clear indications of success and failure, but failure can be controlled to be non-lethal
- The maritime STEM lab is cheap and scalable (starts with a bucket of water, scale to life jackets and bus trip to the water)
- There are opportunities for actual research and engineering at the 9 to 12 level

And

Maritime education increases powers of observation

STEM example 1, classroom

- Take a five gallon bucket and fill with water
- Drop in a block of wood, it floats. Weigh it.
- Drop in an equal sized brick, it sinks, weigh it
- Build a boat the same size as the block with cardboard and duct tape, it floats, weigh it
- This provides all the pieces to explain Archimedes' theory, one of the first recorded instances of true technical analysis

STEM example 2, Seaperch

- The Society of Naval Architects and Marine Engineers sponsors MIT Seaperch, an educational underwater robotics program
- http://www.seaperch.org/index
- http://seaperch.mit.edu/why_sp.php
- There are other robotics programs, but this one also provides a biological and historical angle
- That is called cross disciplinary education

STEM example 3, Boatbuilding

- Take a sheet of plywood and a couple of additional pieces of wood
- Get a couple of kids together and tell them you are going to build a boat
- They will tell you: No way! 2 days later they will be paddling their own boats
- Kids don’t get to build tools anymore, except for maritime tool building
- http://www.navesinkmaritime.org/wiki/doku.php?id=nmha:festival_announce


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STEM example 4, River Rangers

- Take one summer week, 10 six hour canoes, 20 kids and two teachers
- Life jackets and sunblock and paddle away
- An unpredictable adventure starts
- Wildlife, History, Planning, Calculating, Teamwork
- Red Bank Charter School
- http://www.navesinkmaritime.org/wiki/doku.php?id=nmha:river_rangers


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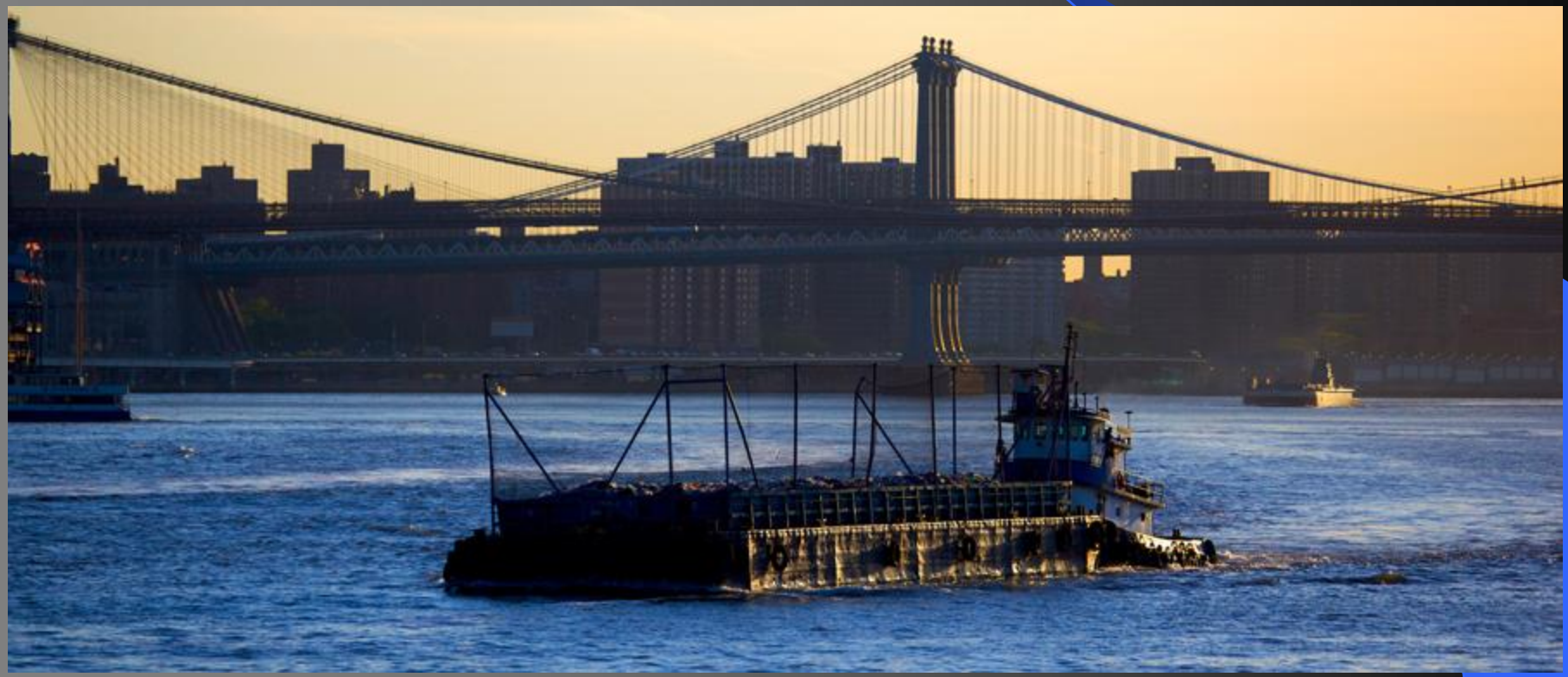
STEM Example 5, MAST

- Marine Academy of Science and Technology at Sandy Hook
- A Monmouth County Vocational School
- The prototype of a world class high school that knows how to use maritime STEM
- Cross disciplinary education
- Free high school and an amazing scholarship machine
- http://www.mast.mcvsd.org/

Other Maritime High Schools

- Philadelphia
- Baltimore
- The NY Harbor School. Governor's Island
- These maritime high schools focus on low income students
- A maritime high school does not automatically lead to a maritime career path, and should not. It trains kids to become capable problem solvers. They are training settings.

MARITIME CAREERS



Maritime Career Path 1
Maritime Academy

- Maritime Academies are colleges and universities that prepare high school graduates for maritime careers.
- These schools graduate their students with a BSc degree ranging from engineering to management, plus a US Coast Guard License to operate ships as ship's officers.
- Subsequent license upgrades will result in senior maritime rank (Master or Chief Engineer)

Maritime Academies

- USMMA Kings Point (free, by appointment, highest per capita income)
- SUNY Maritime, Fort Schuyler (Tuition: Less than $15,000 per year, all inclusive)
- Mass Maritime
- Texas A&M
- Maine Maritime

Fresh Air

Exercise

Maritime Career Path 2 University

- The most common approach is to study Naval Architecture or Marine Engineering. (NAME)
- Naval Architecture is a form of engineering, but it is design oriented like land based Architecture.
- Marine Engineering comes in many forms such as Ocean Engineering, Naval Engineering and occasionally Civil Engineering.

NAME Universities

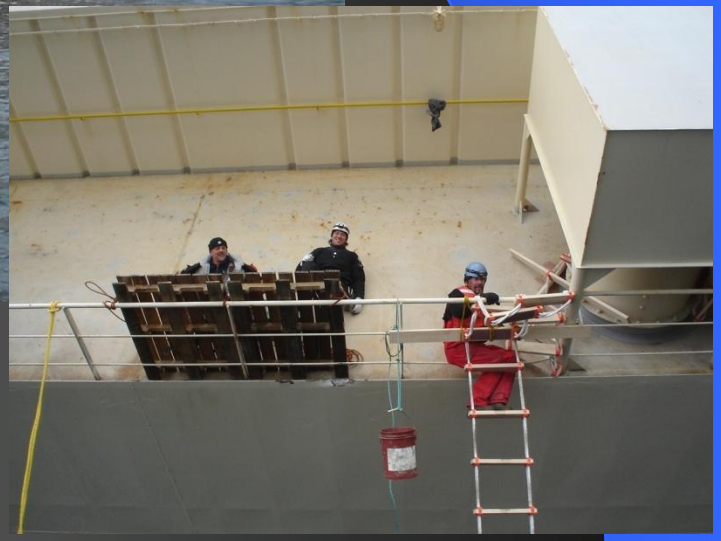
- Webb Institute Naval Architecture (free)
- Stevens Institute (Ocean Engineering)
- Virginia Tech (Aerospace and Ocean)
- University of Michigan
- University of New Orleans
- Canadian Universities (inexpensive)
- Low income students should only do this if the cost is low. Otherwise go to maritime academies

Why would I be interested in NAME?

- High level of art
- Ability to do large projects right away
- Wide scope allows for opportunities to specialize at different stages of career
- Rapid responsibilities
- Worldwide scope
- Hard is fun

Interesting Projects


Makushin Bay



HERBERT HOOVER ON (MARITIME) ENGINEERING

It is a great profession. There is the satisfaction of watching a figment of the imagination emerge through the aid of science to a plan on paper. Then it moves to realization in stone or metal or energy. Then it brings jobs and homes to men. Then it elevates the standards of living and adds to the comforts of life. That is the engineer's high privilege.

The great liability of the engineer compared to men of other professions is that his works are out in the open where all can see them. His acts, step by step, are in hard substance. He cannot bury his mistakes in the grave like the doctors. He cannot argue them into thin air or blame the judge like the lawyers. He cannot, like the architects, cover his failures with trees and vines. He cannot, like the politicians, screen his shortcomings by blaming his opponents and hope that the people will forget. The engineer simply cannot deny that he did it. If his works do not work, he is damned. That is the phantasmagoria that haunts his nights and dogs his days. He comes from the job at the end of the day resolved to calculate it again. He wakes in the night in a cold sweat and puts something on paper that looks silly in the morning. All day he shivers at the thought of the bugs, which will inevitably appear to jolt his smooth consummation.
On the other hand, unlike the doctor his is not a life among the weak. Unlike the soldier, destruction is not his purpose. Unlike the lawyer, quarrels are not his daily bread. To the engineer falls the job of clothing the bare bones of science with life, comfort and hope.

No doubt as years go by people forget which engineer did it, even if they ever knew. Or some politician puts his name on it. Or they credit it to some promoter who used other people's money with which to finance it. But the engineer himself looks back at the unending stream of goodness that flows from his successes with satisfactions that few professions may know. And the verdict of his fellow professionals is all the accolade he wants.

Maritime Career Path 3 Hawsepipe

- Get seaman's papers (Union path)
- Sign on with a shipping company (ferries, tugs, river shipping, small passenger vessels, blue ocean, yachts)
- Get time on the water
- Sit for USCG license upgrades
- Start low, but the path is up ($120,000 for yacht captain)
- Be cautious about trade schools.

Maritime Career Path 4 Shipyard

- Major shipyards still employ thousands of people
- Shipwrights have unique skills that transfer to shore, but it is more difficult for shore based skilled craftsman to transition to ships
- Major shipyards have apprentice schools
- Newport News Shipyard Apprentice School is famous and a great deal

Maritime Career Path 5 Maritime companies

- Look in the back of trade magazines. Maritime companies have job openings for people of all skills
- Jobs are steady
- Some names: Maersk, American Bureau of Shipping, Marad, Moran, Weeks, Horizon Lines, Matson, Exxon, BP, AIG, Monsanto
- Many large companies have significant maritime components. (Walmart)

Maritime Career Path 6 Service Academies

- US Naval Academy
- US Coast Guard Academy
- Start with a military career
- Stay with military or transition to commercial
- USCG academy is probably the best free education available in the world

Maritime Career Path 7
Marine Biologist/Yacht designer

- These are the romantic jobs.
- Beware of anything romantic in Maritime.
- Marine biology and yacht design are wonderful careers, but these careers are for offspring of upper middle class parents.
- The only way to make a small fortune in yacht design is to start with a large fortune
- Recreational boating is incredibly sensitive to economic cycles.

Teachers learning about Maritime

- As teachers you know about maritime; you just look at it from a literary perspective
- Melville (Moby Dick), Conrad (Heart of Darkness, Lord Jim), Hemingway (Old Man and the Sea), Steinbeck (The Lifeboat), O'Brien (Master and Commander)
- Find the historical link: Two Years before the Mast, Sailing alone around the World, The wreck of the Essex, Finding a Ship, The Perfect Storm, Cochrane (on Amazon)

And

- Put the literature in historical context.
- Why did these authors choose to write about maritime?
- Find context today
- Who created the World Trade Centers?
- What is today's piracy?
- Why are Rotterdam and Singapore successful?

And

- What is this high speed rail debate about?
- When should we use rail, when should we fly, when should we drive, when should we use the sea?
- How much subsidy does shipping get?
- Where did all those New York ferries go and why have they come back?
- How fast can I sail a boat across the Atlantic? How has that record changed?

And

- The maritime industry is incredibly education supportive
- Mentoring and training is an inherent and historic part of the industry. The industry will happily extend it to middle and high schools
- American Salvage Association Educational Committee
- Call any maritime company, you will get help. Call me if they don’t.

One final truth:

- Whatever a student learns in maritime is fully transferable to land.
- If I can build living quarters at sea, I can build them ashore
- If I can work in a team at sea, I can work in a team ashore.
- The other way around is not necessarily true
- Maritime education is education on steroids
- Many people trained in maritime succeed ashore because they know how! (Presidents)

Resources

- Most organizations mentioned will show up quickly in search engines under the names provided
- Contact me rhemmen@martinottaway.com if you get stuck
- "A Chronology of Boating on the Navesink" http://www.navesinkmaritime.org/wiki/doku.php?id=nmha:prog_publications_and_purchases