RESEARCH QUESTION

How can an architectural rethinking of the shipbreaking process in Alang improve the environmental, economic, social and working conditions for all parties involved?
The shipbreaking yard employs **40,000** directly & **200,000** indirectly making it one of largest industry's in India.

**470 deaths** since 1983. On average **16 deaths a year**.

Largest shipbreaking yard in the world. **50%** of the world's discarded ships are broken at Alang, India.

**183** shipbreaking plots.

Roughly **315** ships will be left to be dismantled on the shores of Alang per year.

**13** meter tidal range.

**10km** of coastline.
SHIPBREAKING PROCESS

Day 1

Reached on a King Tide

Broken down by hand into sections

Broken down further into manageable sections

Melted down

Removed from site

Day 80

Recycled metal used as rebar for construction throughout India

KEY ALANG SHIPBREAKING NUMBERS

Plots 180
Workers 40,000
Workers per Plot 244

Variable width size of each Plot.

30m 200m

ECONOMICS

Minimum amount of tonnage(t) per plot needs to produce in order to be profitable.

30m 120m 10,000t per ship
120m 200m 25,000t per ship

OVERALL

Average tonnage of 12,444t per ship
Average US price per tonnage $360

12,444 x $360 = $3,724,240 Revenue
Throughout the world, there are thousands of abandoned containers left at docks because of their operational lifespan of twelve years. Their size and characteristics are universal in order to facilitate the handling and transport of them. As part of a sustainable strategy for the project, it was determined that these containers could be recycled and integrated into the design in several different ways.

One way that they could be utilise as small modular houses for the thousands of workers, replacing their current living conditions in the slum dwellings. The number of workers required on site varies based on the size of the ship being broken and this modular system can respond to that demand by increasing or decreasing the number of housing units as the work requires.

There are many examples around the world of containers being used for housing, particularly in wake of a disaster or as a transitional form of housing. (Mehra, 62)
IMPROVED SHIPBREAKING PROCESS

56 DAYS
Biomimicry Principles

Key
1. Hydrophilic
2. Hydrophobic
3. Droplet
4. Rolls
5. Mouth
6. Angles to back

Key
1. Hydrophilic
2. Hydrophobic
3. Vapor Catcher
4. Wind Caught, rolling down inside the catcher, creating condensation resulting in dropped water
5. Water Droplets
6. How Catchers can be applied to the roof as a facade system to collect water for the community.
CAD MODELING ITERATIONS OF THE BIOMIMICRY INFLUENCED ROOF
EXPLODED ISOMETRIC OF SHIPBREAKING SYSTEMS

KEY
1. Water collection Roof
2. Truss
3. Shipbreaking lift
4. Container System
5. Housing
6. Circulation
7. Cotton System
8. Lower System
9. Oil burning
10. Structure
ISO OF HOUSING SYSTEM

KEY
1. Water towers
2. Worship Area
3. Family living levels
4. Single living levels
5. Food Market level
6. Circulation
7. Bathing Steps
8. Bathing Area
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FAMILY HOUSING CONTAINER

KEY
1. Kitchen/Dinning
2. Bathroom
3. Bunkroom
4. Master Bedroom

The family units are made up of two connected standard shipping containers that are self-contained. The containers house a kitchen/living space, a bathroom, a bunk room, and a master bedroom. While the areas are all small they are vast improvement from the slum dwellings.
The single housing units house the majority of the shipbreaking inhabitants. These units provide a communal living arrangement. Each container has been designed to house a different function. The units have been broken down into communal bunkrooms, a kitchen, a bathroom and a living/dining space. This living arrangement ensures that a large amount of workers are able to live on site in an improved housing environment. The design provides outdoor spaces for socialising and eating, as seen in design plan.

KEY
1. Toilets
2. Bunk Rooms Sleeping Six
3. Dining Room
4. Kitchen
SHIPBREAKING PLATFORM
Cut Ship into a large section.

Further reduce section on the shipbreaking platform into manageable pieces that can be carried to the empty shipping containers.

Automated container system removes the shipping containers full of scrap metal from the shipbreaking platform to storage.

A truck removes the full shipping container and transports it to the recycling plant.

The shipbreaking platform is controlled by a lift that moves down as each section of the vessel is cut.
COTTON SYSTEM
KEY

1. Water collection from the roof, supplies fresh water for the cotton plants.

2. Air ventilation is controlled by the fans.

3. Cotton runs around the structure and under a vessel to absorb any spilled oil.
