



I PRO 308

TSUNAMI RELIEF

Team Members

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Advisors:

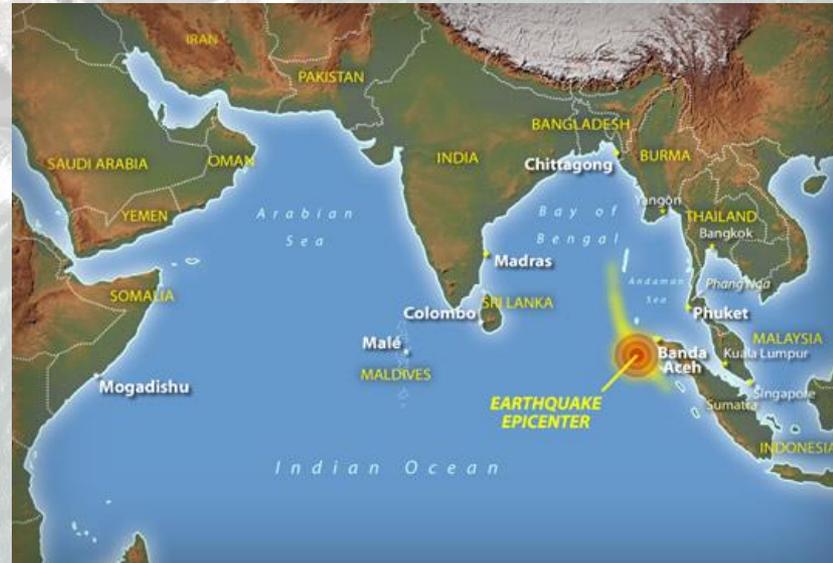
Jay Fisher

Francisco Ruiz



The Tsunami

- **Magnitude:** 9.0
- **Date / Time:** Sunday, December 26, 2004 at 7:58:53 AM
- **Location:** 3.307° N 95.947° E
- **In total,**
 - More than 280,000 people were killed,
 - 14,000 are still listed as missing,
 - Over 1,100,000 were displaced



Problem

- How can all levels of the IIT community (faculty, students, and alumni) collaborate in a long-term effort to provide support to the victims of the tsunami in their time of need?



Approaches

An aerial photograph of a coastal town, likely in a developing region, showing a dense cluster of buildings and a prominent white sandy beach along the shoreline. The ocean is visible in the lower right portion of the image. The entire image is overlaid with a semi-transparent, light-colored filter.

- Pinpoint viable solutions
- Contact NGOs for possible sponsorship and direct relationship
- Help set up future IPROs for further research and investigation of IIT's aiding services

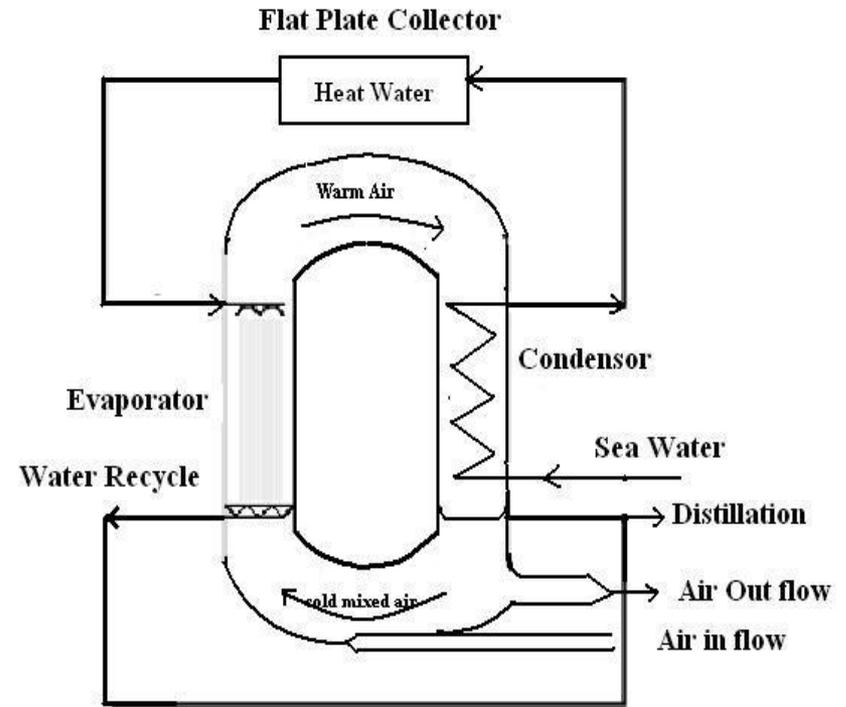
Approaches

An aerial photograph of a coastal town, likely in a developing region, showing dense residential buildings, a sandy beach, and the ocean. The image is semi-transparent, allowing the text to be overlaid.

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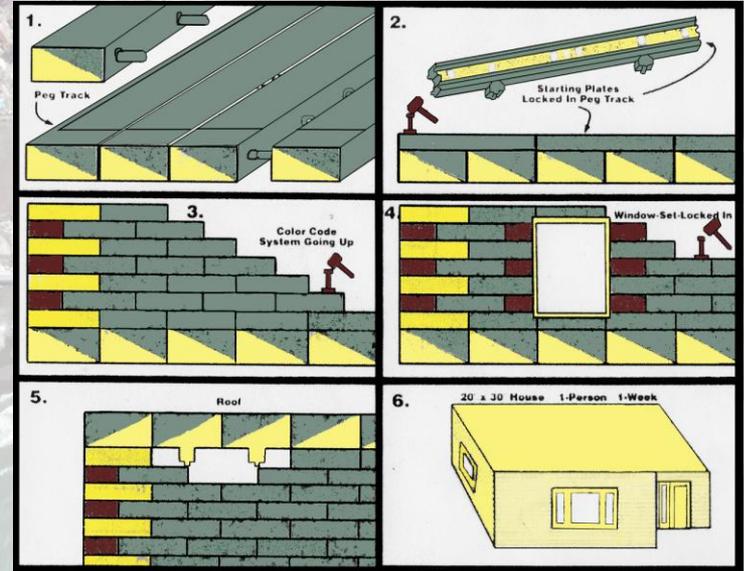
Solar Desalination of Water

- **Aim:**
 - Overcome the shortage of potable water
- **Technique:**
 - Humidification-Dehumidification Cycle
- **Advantages:**
 - Flexibility in capacity,
 - Low operating costs
 - Simplicity,
 - Possibility of using low-grade thermal energy
 - 100 liters of fresh water out of 8.5 m² collector area
- **Needs for Development:**
 - High capital costs
 - Not commercially developed



Lama Homes

- **Aim:**
 - Low cost housing
- **Technique:**
 - Self-help mail order home kit
 - Color-coded wall pieces and peg tools
- **Advantages:**
 - Low costs
 - Promotion of unskilled labor
 - A 10 year-old can build it
 - One person can build a 20 ft by 30 ft house in a week
- **Needs for Development:**
 - To date the Lama Home project is searching for an investor and manufacturer
 - Does not use indigenous materials



Low-Cost Water Purification System

“CLAY POT”

- **Aim:**
 - Meet an urgent demand for safe water in developing countries
 - Provide employment for local potters
- **Technique:**
 - Porous clay filter unit saturated with silver as a germicide/disinfectant
- **Advantages:**
 - Eliminates 99.88% of water-borne disease agents
 - Low cost, \$6.00 investment per household
 - Cited by the United Nations' Appropriate technology Handbook
 - Used by the International Red Cross and Doctors Without Border
- **ENPRO project for IIT students next semester**



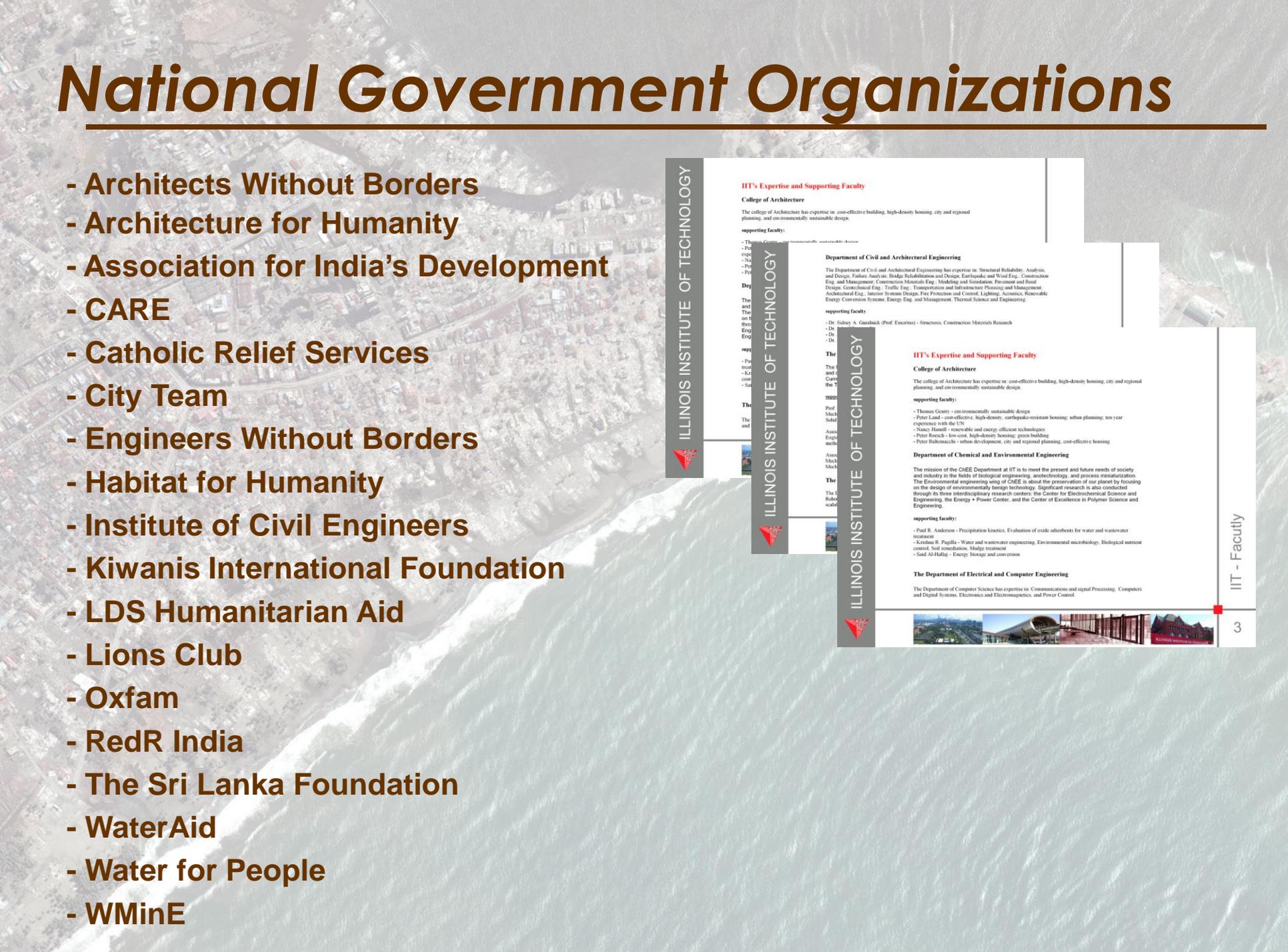
Approaches

An aerial photograph of a coastal town, likely in a developing country, showing a dense residential area with many small buildings. The town is situated on a peninsula or a narrow strip of land, with a sandy beach and the ocean in the foreground. The water is a deep blue-green color. The overall scene is somewhat desaturated, giving it a historical or archival feel.

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National Government Organizations

- Architects Without Borders
- Architecture for Humanity
- Association for India's Development
- CARE
- Catholic Relief Services
- City Team
- Engineers Without Borders
- Habitat for Humanity
- Institute of Civil Engineers
- Kiwanis International Foundation
- LDS Humanitarian Aid
- Lions Club
- Oxfam
- RedR India
- The Sri Lanka Foundation
- WaterAid
- Water for People
- WMinE



ILLINOIS INSTITUTE OF TECHNOLOGY

IIT's Expertise and Supporting Faculty
College of Architecture

The college of Architecture has expertise in cost-effective building, high-density housing, city and regional planning, and environmentally sustainable design.

supporting faculty:

- Thomas Greany - environmentally sustainable design
- Peter Land - cost-effective, high-density, earthquake-resistant housing; urban planning; ten year experience with the UN
- Nancy Hamill - renewable and energy efficient technologies
- Peter Roesch - low-cost, high-density housing; green building
- Peter Fahrenschock - urban development, city and regional planning, cost-effective housing

Department of Civil and Architectural Engineering

The Department of Civil and Architectural Engineering has expertise in: Structural Reliability, Analysis, and Design; Failure Analysis; Bridge Rehabilitation and Design; Earthquake and Wind Eng.; Construction Eng. and Management; Construction Materials Eng.; Modeling and Simulation; Pavement and Road Design; Geotechnical Eng.; Traffic Eng.; Transportation and Infrastructure Planning and Management; Architectural Eng.; Interior Systems Design; Fire Protection and Control; Lighting; Acoustics; Renewable Energy Conversion System; Energy Eng. and Management; Thermal Science and Engineering.

supporting faculty:

- Dr. Sidney A. Garaski (Prof. Emeritus) - Structures, Construction Materials Research
- Dr. ...
- Dr. ...
- Dr. ...

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Department of Chemical and Environmental Engineering

The mission of the CHEE Department at IIT is to meet the present and future needs of society and industry in the fields of biological engineering, nanotechnology, and process miniaturization. The Environmental engineering wing of CHEE is about the preservation of our planet by focusing on the design of environmentally benign technology. Significant research is also conducted through its three interdisciplinary research centers: the Center for Electrochemical Science and Engineering, the Energy + Power Center, and the Center of Excellence in Polymer Science and Engineering.

supporting faculty:

- Paul R. Anderson - Precipitation kinetics, Evaluation of oxide adsorbents for water and wastewater treatment
- Krishna R. Pagilla - Water and wastewater engineering, Environmental microbiology, Biological nutrient control, Soil remediation, Sludge treatment
- Said Al-Halajj - Energy Storage and conversion

The Department of Electrical and Computer Engineering

The Department of Computer Science has expertise in Communications and signal Processing, Computers and Digital Systems, Electronics and Electromagnetics, and Power Control.



IIT - Faculty

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Engineers Without Borders™

Building a Better World One Community at a Time



**ENGINEERS
WITHOUT
BORDERS
USA**

A non-profit volunteer humanitarian engineering organization.

Engineers Without Borders™

Vision:

EWB-USA's vision is of a world where all people have access to adequate sanitation, safe drinking water, and the resources to meet their other self-identified engineering and economic development needs.



Engineers Without Borders™

EWB-USA Goals:

- **Improve quality of life**
- **Empower communities**
- **Develop globally and environmentally sensitive engineers**
- **Advance sustainable engineering practices**

EWB-IIT Goals:

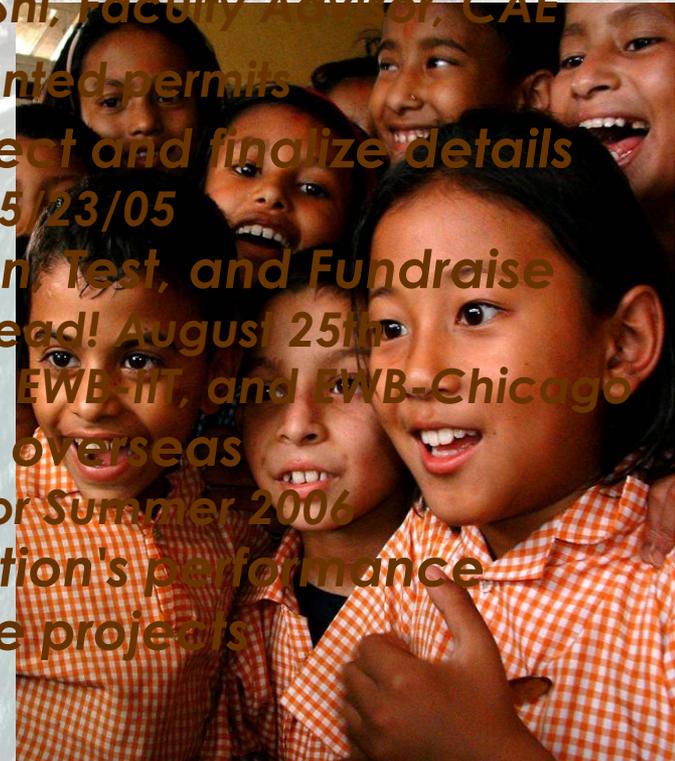
- **Raise awareness**
- **Explore service learning with IPROs**
- **Create relationships (professional, academic, humanitarian)**



Engineers Without Borders™

Moving Forward...

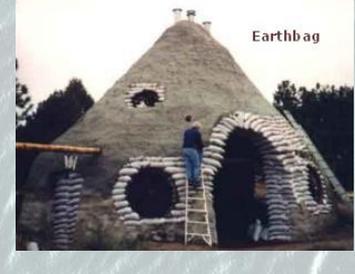
- Contact EWB-Chicago; discuss possibilities to support IPRO 308
 - Mr. Gary Jones, PE, Sergeant Instructor, and Dr. Jonathan Shi, Faculty Advisor, CAE
- Propose IPRO 308 (Fall 2005) • 6 students granted permits
 - Approved!!
 - Propose for project and finalize details
- Advertise for student interest • Proposal due 5/23/05
 - 50 students signed mailing list
 - Research, Design, Test, and Fundraise
- Hold a meeting
 - Full Steam Ahead! August 25th
 - with IPRO 308, EWB-IT, and EWB-Chicago
- 20 students attending (less implementation overseas)
 - Executive Board Elected
 - Spring Break or Summer 2006
- Register as a student organization
 - Monitor the Solution's performance
 - Propose for more projects
- Dr. Krishna Pagilla, Faculty Advisor, CHEE
- Submit Student Chapter Agreement



- The Design-Build of Site Specific Sustainable Building Systems

- What is sustainable building?

- **Locally available, renewable resources**
e.g. bamboo, cobs, earthbags, clay, thatch, sewage sludge
- **Collaboration of traditional and technological building techniques and systems**
e.g. passive heating and/or cooling methods cheap efficient procedures
- **Cost effective building**
human labor VS capital
- **Design-Build Approach**
a rapidly produced product that is feasible and possible



- The Design-Build of Site Specific Sustainable Building Systems

IPRO APPROACH

- Develop or improve a building system originating from traditional building customs and locally available materials.
- **Design:**
 - Investigate of local customs, materials, and common construction methods
 - Decipher appropriate local materials
- **Build:**
 - Full scale mock-up of building



– The Design-Build of Site Specific Sustainable Building Systems

Site: Meulaboh, Indonesia

- More Than Half of Meulaboh's Population is Dead or Missing
- Distribution of aid and evacuation efforts are hampered by the lack of petrol
- Available natural resources as well as recyclable materials



An aerial photograph of a coastal town, likely in the Philippines, showing a dense residential area with a grid-like street pattern. A river flows through the town, and the ocean is visible in the foreground with white surf breaking on the shore. The text 'THANK YOU IIT' is overlaid in the center.

THANK YOU IIT