

Structural engineers in humanitarian and international development: a new resource map

Miriam Graham introduces a new tool from the IStructE Humanitarian and International Development Panel which aims to direct those working in, or curious about, the sector to key guidance and skills training.

Introduction

There is a great potential for structural engineers to have a positive impact by using their skills to support development in low- and middle-income countries and for humanitarian responses to disasters – especially with the rising challenges from climate change, the impacts of which will disproportionately affect those in the Global South.

There is also the challenge of how to meet the UN Sustainable Development Goals, when the current methods we have for development generally have high associated emissions¹. It is our responsibility as structural engineers to help answer the question: how do we build to develop communities, to be resilient into the future, and do so within our planetary boundaries?

The IStructE Humanitarian and International Development (HID) Panel has produced a resource map (**Figure 1**) to help equip engineers to address these challenges. The map highlights key resources from case studies and technical guidance, to databases and complementary skills training. Whether you've been in the sector and are looking for the latest information, are wanting to explore starting your career in the sector, or are interested in what it means to be a structural engineer in different contexts, the map has resources for you.

What is the HID Panel?

The IStructE HID Panel was formed in 2017 with the aims of supporting structural engineers within, or interested in, the sector through sharing knowledge and guidance, advocacy, outreach and networks. The panel's members come from a wide range of professional backgrounds and countries and have experience in a variety of fields: structural engineering for development projects, working for non-governmental

organisations (NGOs) and international funding organisations, post-disaster search and rescue specialists, and academics.

The panel has developed a range of content to support engineers, including a competency framework for those working in a humanitarian or international development context (www.istructe.org/resources/guidance/humanitarian-international-dev-framework). This follows the arrangement of the IStructE Initial Professional Development framework, but is tailored with the addition of supplementary skills, knowledge and competencies required for those operating in the sector.

What's in the new HID resource map?

The new HID resource map aligns with the different focus areas within the competency framework, highlighting key resources in these categories from both internal and external sources which are accessible for members to develop their knowledge and skills. The map is available on the Institution's website and the HID Panel page.

In the centre of the map sits **contextual awareness**, as this underpins all the principles of working within the sector. When working in new and different settings and cultures, we should carefully consider the value and skills we can offer alongside both the positive and negative impacts we may have on communities. This is explored further in the panel's FAQs on the IStructE website (www.istructe.org/resources/guidance/humanitarian-and-international-development-faq).

It is important for users to check and validate that the sources, information and design principles are relevant, and that they understand any limitations. We encourage designers to think about the differences between the source and the project and community they are applying it to.

A few resources as a panel we think would be a good place to start are:

- | **Working in the humanitarian or development sectors** (IStructE) – an article by the panel which provides a realistic overview of the practical and ethical considerations when seeking to work in the sector
- | **Career profiles** (IStructE) – introductions to different people working within the sector, including some of the panel members
- | **Humanitarian civil engineering: practical solutions for an interdisciplinary approach** (ICE) – a book which explores how to develop sustainable solutions integrating social, environmental, cultural and economic systems.

As a panel, we hope you find the map helpful and the resources interesting! We are aware that new resources are emerging all the time and will periodically update the map, so get in touch (technical@istructe.org) if there are resources you think should be included, if you have any feedback, or if there are any gaps for new resources or support you would like the panel to explore.

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REFERENCE

- 1) **Newby T. (2022)** 'Engineering climate justice: how can we contribute to equitable global decarbonisation?', *The Structural Engineer*, 100 (8), pp. 10–12; <https://doi.org/10.56330/ZWOT9464>

Short Reads
Housing, Land and Property
In Shelter Programs (Concordance Ordeman's Foundation)

Longer Reads
2022 State of Humanitarian Systems report (ALNAP)
The State of the Humanitarian System report assesses the state, shape and momentum of the humanitarian system and based on evidence from on-the-ground practitioners, crisis-affected populations, academics, policy-makers and others.
Integrating Housing, Land and Property Issues into Key Humanitarian, Transitional and Development Planning Processes (International Organization for Migration)



10. Commercial and legal

11. Other resources



9. Management and Training

Websites
Disaster Ready - free, online humanitarian and development training (Disaster Ready)
Development Professionals Kenya - free, online humanitarian humanitarian leadership Academy

Contextual awareness and appropriate interventions

When working in different countries and contexts it's important to check and validate that the sources, information and design principles still apply. It is helpful to think about the differences from what you are residing and the project you are working on. The resources below explore this concept in more depth.

Websites
The New Humanitarian
Commissioe Global
Local culture, customs and etiquette
OCHA Humanitarian Response Building Back Better: Delivering people-centred housing reconstruction at scale
Humanitarian and International development: FAQs

Short Reads
Shelter response profiles (CPAtern)
Local and specific information on disaster preparedness
Putting People at the Centre of Reconstruction (Practical Action)
Community engagement in disaster response, 2019 Gorkha, Nepal (Structe)

Longer Reads
Lessons from Aechh Key considerations in post-disaster reconstruction (World and Overseas Emergency Committee)
Shelter After Disaster (IFRC and OCHA)

Video
Starting from 11 mins: Appropriate structural and non-structural development consults (ICL /Asp)

1. Professional standards and engineering responsibility



Development and humanitarian concepts and practices

Websites
CARE Emergency Toolkit
Shelter self-recovery
CCCM cluster (Camp Coordination and Camp Management)
Longer Reads
Principio Principles 2005 (Shelter Cluster)
Settlements approaches in urban areas (Global Shelter Cluster)
UNHCR Shelter, camp and settlement guidelines (UNHCR)
Engineering in Emergencies (Redf)

Career Profiles

Websites
Career Profiles (Structe)
Global agendas and frameworks
The Grand Bargain (ASC)
UN Sustainable Development Goals (UN)
Global Shelter Cluster

Websites
Humanitarian Standards Partnership
Core Humanitarian Standards Alliance (CHS Alliance)
Short Reads
Working in the humanitarian or development sectors (Structe)
The practical and ethical considerations when setting to work in the sector
Humanitarian and International development complexities framework (Structe)
Humanitarian and International Development: A practical guide for the sector (Panel 4 designed to address the types of humanitarian and international development work in the development sector)

Longer Reads
Humanitarian Civil Engineering: Practical solutions for an interdisciplinary approach (CE)
This book allows you to understand the engineering and design challenges and how to develop sustainable solutions that integrate social, environmental, cultural and humanitarian considerations.
The Shelter Handbook (Shelre)

2. Communication



Websites
The Shelter Compendium (ICL)
ICL database for research (Education, and Communication (EC))
Specialised resources in crisis response for shelter and settlements.

3. Concept creation and design

Websites
Thinkhazard (World Bank GFDRR)
Longer Reads
RED rating (Asp)
Short Reads
Is it feasible structural engineering possible in a humanitarian context? (Structe)
The last story remains: rebuilding and restoring the lives and resilience of disaster-impacted people in the Rohingya refugee camps.

4. Analysis and sizing

6. Sustainability



Short Reads
PICA - climate-positive design using locally sourced materials (Structe)
The concept of climate-positive design for the design of the National Institute for Conservation Architecture
Engineering climate justice: how can we contribute to equitable global decarbonisation? (Structe)
A personal perspective
How can structural engineers contribute towards disaster mitigation? (Structe)
In the Moment: Steven 2017 Award-winning paper, Jishu Maekawa advocates the adoption of a systems approach to the delivery of resilient buildings and infrastructure
Greening Shelter Response (Global Shelter Cluster (GSC))
Longer Reads
Building Materials and The Climate: constructing a new future
Climate-resilient and nature-based solutions to reduce environmental impact of construction and residential low carbon construction in a global context
Nature-based solutions for climate resilience in humanitarian action (Sphere)

7. Construction & risk management



Websites
Hostile Environment Awareness Training
Longer Reads
GSC Construction Good Practices (Global Shelter Cluster)

8. Health, safety and risk management

Please Note: These resources are highlighted in the map for their potential value to the sector. Further resources are available via the Structe Humanitarian and International Development Portal website, as well as new resources published onto the portal update regularly. The inclusion of these resources does not necessarily endorse or imply responsibility for any statement or opinion expressed within these.

5. Materials



Masonry

Longer Reads
How to Build Safer Houses with Confined Masonry (Practical Action)
Short books on confined masonry and detailing
Constructing Low-rise Confined Masonry Buildings
Book on low-rise confined masonry

Timber and Bamboo

Videos
Sustainable bamboo housing (Structe)
A resilient, affordable, sustainable and aesthetically-pleasing bamboo housing technology for low-income and rural populations
Short Reads
11 recommended reads on using timber and bamboo (Structe)
Longer Reads
Timber as a construction material in humanitarian operations (UNOCHA/IFRC-CARE)
Humanitarian Bamboo Guidelines (Humanitarian Bamboo)

Wattle & Daub

Longer Reads
Wattle & Daub: Anti-seismic construction Handbook (CPAtern-Asp)
Design Guide for Engineered Baraque Housing (M&A)
Mission engineering wattle and daub

Zoom in to click the links and use Ctrl+F to search



Access the resource map
The new humanitarian and international development resource map is an interactive guide to key resources in the sector.
Explore the map at: www.istructe.org/resources/guidance/hid-resource-map

