# Journal of Humanitarian Engineering

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engineers without borders australia



# Journal of Humanitarian Engineering (JHE)

The Journal of Humanitarian Engineering (JHE) is an open access publication that publishes outcomes of research and field experiences at the intersection of technology and community development. The field of "humanitarian engineering" describes the application of engineering and technology for the benefit of disadvantaged communities. The field spans thematic areas from water to energy to infrastructure; and applications from disability access to poverty alleviation. The JHE aims to highlight the importance of humanitarian engineering projects and to inspire engineering solutions to solve the world's most pertinent challenges.

For more information, visit: www.ewb.org.au/journal.



## PUBLISHING

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## INDIGENOUS AUSTRALIAN ACKNOWLEDGEMENT

EWB respectfully acknowledges the Traditional Owners of the Country on which we work.
To learn more about our commitment to reconciliation, read EWB's Reconciliation Action Plan.

Cover photos:
An irrigation project under construction in Ancash Peru facilitated by the Greater Austin Chapter of EWB USA. Image courtesy of Jim Clark.

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# GUEST EDITORIAL

*Recognising our failures to enable positive change*

In a small rural community in Peru, a chlorination system is installed at an existing storage tank in the community to disinfect the water, making it potable. Within weeks after the team completes the implementation and returns home, the community disconnects the chlorinator because community members are complaining about the taste and are unwilling to drink chlorinated water. In neighboring Bolivia, a community well stops providing access to clean water because the electric pump stops working and the community doesn't have the technical skills or financial capacity to repair the pump. The community does not know how to get in touch with the team that installed the well and they have gone back to hiking three hours to collect water.

Whilst not examples we would provide right out of the gate, these project failures, when analysed constructively, provide powerful insights and memorable lessons that rival many of the successes we have experienced. In fact, these failures might be "good" failures, or what Sim Sitkin, Duke University Professor of Management, calls "intelligent failures", because they provide new and valuable knowledge that allows us to continually improve upon our model.

Since our inception in 2002, Engineers Without Borders-USA has developed a portfolio of more than 600 projects in over 40 countries across the globe. We have offices in four countries, with more to be established in the coming years. Through the collective efforts of our staff, members, volunteers, and partners, we have touched over millions of lives by providing engineering services resulting in wells, bridges, latrines, and solar grids.

That is the story we typically tell. We have great successes to be sure, but also a number of failures. Big, small, and in between. And, we embrace them. With failure comes the opportunity to continuously improve our model and delivery process and moves us closer to meeting our mission of building a better world through engineering projects that empower communities to meet their basic human needs.

From our earliest EWB-USA projects, one of our focuses has been on learning from the work we complete with the goal of improving upon our collective work as an organization. In 2014, we rolled out a robust Planning, Monitoring, Evaluation and Learning (PMEL) model that incorporated documenting lessons learned and using those lessons learned to inform process or policy changes to help improve our model. We established standard indicators across our six project types to report on overall outcomes. Our desired outcomes include not only the functionality of infrastructure, but also the education and capacity building in the communities where we work to ensure the long-term operation and maintenance of the systems we build in collaboration with local communities.

In 2018, EWB-USA is implementing an improvement to our current PMEL system to align our outcomes more closely with the United Nations Sustainable Development Goals. This was a result from lessons learned since the initial rollout.

We encourage our members to report on failures as much as successes, embracing learning for all of our stakeholders. This means creating a safe environment. In addition to promoting transparency, we also provide the necessary feedback loops and processes established to be able to report and share lessons learned. Finally, we expect every project to include educational aspects at every phase throughout the project, to support building capacity to maintain their systems, but also to instill a sense of ownership.

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So what have we learned from our collective work for the last 15 years?

1. An important part of our educational approach is to include training and a robust operation and maintenance (O&M) manual that is usable by the community members responsible for the system. A comprehensive O&M Manual should take into account the community's literacy level as well as their ability to raise and save funds for future project maintenance needs. It should also include a list of replacement components for the system, as well as the cost and where to find the needed supplies locally. Most manuals also include contact information for local repairmen who can address and special technical issues with the system, as well as guidance on how often to inspect various components of the system and how to document and keep good records of their inspections. Every completed EWB-USA project includes this essential component of sustainable development work.

2. The non-technical components of a partnership and project are often more critical than the technical components. These non-technical components include things like political, educational, cultural, and economic factors that are unique to each community. These components must be factored into the design approach to ensure overall success of a project. We must also be aware of what we mean when we use the term "success". Is success a technical solution, or a more holistic solution that looks at both technical and non-technical components?

3. We can improve our overall delivery model at a higher success rate with staff on the ground in the countries where we work. Local national staff on the ground can provide added value in these areas:
   - closer management and oversight of all projects
   - more accurate assessments of communities' needs
   - reduced timeframes for project completion
   - integration of local knowledge
   - improved project cost, efficiency and quality
   - improved accountability to our communities
   - provide logistical help to volunteers
   - enhanced vetting of programs to ensure a project is a good fit from the start

Our Strategic Plan challenges us to increase the number of communities we serve via the establishment of country offices and while reducing the number of countries in which we work. We are going deeper, not wider, by moving to a field-driven approach. Country offices staffed with local experts, such as our current field operations in Guatemala and Nicaragua, will guide our programming in the future. This concentrated effort allows for the implementation of projects that scale and replicate, an ideal that we have not been able to achieve with our past method of operation.

With a strong history of lessons learned and a clear and ambitious strategic vision, we aim to transform EWB-USA into an INGO leader in sustainable engineering. We've learned these lessons through trial and error and we've put increased emphasis on understanding "failure" and embracing the myriad of valuable lessons we've learned from it. Having the courage to confront failures allows us to be a more effective organisation around the globe.

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