

## What would a Citizen Engineer do with the BP Oil Spill

Written by Administrator

Friday, 11 June 2010 05:54 - Last Updated Wednesday, 01 December 2010 11:11

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In a world of increasing complexity, accidents happen. This accident is a tragedy with 11 dead and 17 injured in an explosion that created the worst oil spill in the history of the United States. Let's start the clock over on these events and explore what a Citizen Engineer would do.

### Managing the Gulf Coast Oil Spill, the Citizen Engineer way



It is April 20, just after the blow out. The Citizen Engineer, holding the title Chief Engineer at the company, was notified immediately by email, text and phone. Right away, she started a number of things in parallel. First, her office took control and governance of the situation and began acting as the general contractor for the accident. There were four fronts to work on:

- Root cause of explosion and rig stability
- Continuing leaks
- Spill clean-up at sea
- Spill clean-up on land

This Chief Engineer's office placed lead engineers on all these fronts, but to illustrate the point of our story, we will focus only on efforts to stop the continuing leaks.

In the first 24 hours, her team classified the accident as a [complex situation](#), beyond the solution scope of past accidents. It was classified as complex due to the depth of water, pressure, size and number of leaks and the state of the well including the stuck drilling rods. It was clear that relief wells would be the correct long-term fix, but they were months away. As a result, her team quickly realized that this complex situation required them to learn as fast as possible from as wide group of people and as many experiments as possible. Simply reaching

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to internal or known experts of past solutions in shallower, more straight-forward situations would be fine in a complicated situation, but the pre-conceived solutions could actually hurt in this situation. After meeting her response team on-site, she launched the following parallel efforts:

1. Opened communications to the world via Internet to communicate video and known conditions of the accident including live underwater video feeds, movies of experiments and well configurations.
2. Called for counter-measures ideas and technologies from the petroleum engineering community with special requests to Norway and Brazil, the two leading countries with deep water well expertise.
3. Set a daily cadence for coordinating status and learning inside her team.
4. Pulled well experts from their partners, [Halliburton](#) and [Transocean](#) to staff her disaster response team.
5. Procured the submarines and well capping equipment for these depths.
6. Developed a model of the underwater site to make communication about the situation more clear.
7. Authorized the drilling of relief wells for long-term containment.

By opening communication of the situation to the world and inviting engineering help via the Internet, her team encouraged a [crowdsourcing](#) and expert sourcing approach to the problem. As a result, they quickly received estimates on the amount of oil leaking from scientists who were familiar with measuring flows simply based on the video feeds. Having understood the large magnitude of this flow, the response team was able to garner more dollars to expedite experiments based on simple, back-of-the-napkin estimates of costs due to fines and clean-up that would accumulate each day the well leaked.

Simultaneously, the web site was collecting potential countermeasures from petroleum as well as civil and aeronautical engineers from around the world. These countermeasures were filtered by the web team and small groups of response team engineers were doing quick research, experiments and models to boil up the most feasible and effective ones. A web-based social media voting and comment system was allowing outside engineers to validate their thinking. As the most effective countermeasures emerged, the team started to describe experiments necessary to learn how to evaluate the valid sets of potential solutions. Using their growing resources, the response team launched multiple experiments using models and simulations to accelerate their [Orient-Observe-Decide-Act loops](#). Based on what they understood, they took a set-based approach to running these experimental solutions under the sea.

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At the end of the first 24-hour cycle, they were clear on the first three underwater efforts. These efforts were quick, easy and non-destructive to other efforts. Within the next three days, their first experiments did not attempt to slow the leak, but they learn much more about the actual situation of the undersea drill rig, the actual leak size and mix of gas and oil. This data allowed them to update their models and again narrow their choices, as well as feed the root cause and leak containment teams some valuable facts. They were learning and now major equipment was starting to arrive at the site. They chose to work on the quickest solutions that had the highest estimated effectiveness and least likelihood to ruin the well site for further efforts. All of these models, experiments, and solutions sets were published on the web site in real-time. The web site formed the basis for governmental and public communication updates as well kept the worldwide crowd of paid and volunteer engineers in the loop.

This learning-first approach led to some quick wins that started to slow the leaks only 10 days after the accident and fully contained it 14 days later. There was now an estimated 200,000 barrels in the water. Her attentions turned to other teams. One had the long-term, relief well underway with an estimate of 2 more months to completely contain the band-aided well from other leaks. The results of the response teams efforts kept the total spill size to less than the [2 50,000 barrels spilled by the Valdez in 1989](#)

and less than the

[7 million barrels spilled during Katrina](#)

. The Chief Engineer's teams had used all the best thinking and resources from around the world to narrow to a short-term fixes very quickly.

To conceptually "pay back" the world of volunteers and future deep sea oil teams, the problem sheets, experiment results and retrospective meeting notes are all freely available on the corporate web site. This site and content are open and shared with the world in an open source manner. These notes provide data for future Chief Engineering teams to reference during future accidents. They also provide an engineering case study and market data for equipment suppliers to the petroleum industry to help make these kind of efforts safer in the future. They know that by working fast and leveraging all the world's resources, they directly attacked the highest economical, ecological and social risk quickly.

### Are you a Citizen Engineer?

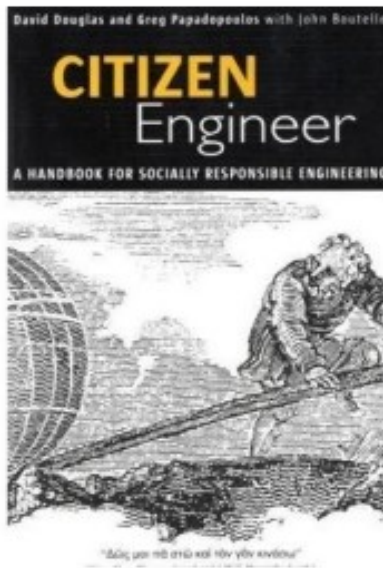
Things are changing, as we are rightfully blurring the lines between economic, social and environmental responsibility. Everyone is having to become more responsible to the [triple bottom line](#)

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To put it simply as possible, Citizen Engineers are the connection point between science and society - between pure knowledge and how it is used. Citizen Engineers are techno-responsible, environmentally responsible, economically responsible, socially responsible participants in the engineering community.

- Citizen Engineer

In this new world, the Citizen Engineer needs to be responsible to technology, ecology, society and economics. In many cases, the Citizen Engineer must acknowledge the difference between problems and difficulties. Problems have answers, but for the difficulties we can do nothing but try to address it in our increasingly large-scale, interconnected and complex world.

Who knows if this approach would lead to a smaller spill in the future, but it would certainly lead to faster learning in the next set of accidents.

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**Ryan Martens** is a civil engineer, founding board member of the **Entrepreneurs Foundation of Colorado**

and CTO at

**Rally Software Development.**

(An similar version with comments of this post is on my corporate blog at [www.rallydev.com/agileblog](http://www.rallydev.com/agileblog))