From Hell’

The way GM handled a fatal flaw provides grist for instructors in engineering ethics.

By Art Pine
When Laura Grossenbacher read about a faulty General Motors ignition switch blamed for numerous fatal crashes, she quickly recognized its potential as a case study in engineering ethics. She made a mental note to look into it for a future course at the University of Wisconsin-Madison, where she directs the Technical Communication Program in the College of Engineering. But her students didn’t want to wait, so Grossenbacher worked it into a webinar this fall. “Both professional engineers and engineering students want to talk about this now,” Grossenbacher says, “and my view is that if they want to talk about it, why not do that? If we want to keep ethics education alive, we need to emphasize that this isn’t about some bygone era; it’s about something that is happening now. And we ought to use it.”

Indeed, the litany of documented lapses at GM has all the makings of a classic contemporary lesson in ethical failure, according to several engineering ethics instructors — on a par with such frequently taught examples as the Challenger space shuttle disaster, the Ford Pinto explosion-prone fuel system, and the Chevrolet Corvette, the main subject of the 1965 Ralph Nader book, Unsafe at Any Speed. Moreover, compared with these earlier cases, the ignition switch episode appears to have involved more ethics failures by engineers as opposed to marketing gurus, bean counters, executives, or lawyers.

“It’s overwhelming how much there is to it,” says Henry Petroski, who holds dual professorships in civil engineering and history at Duke University and has written and authored reports about the ethics of engineering failures. (He has a regular column in Prisms.) “There’s a younger generation of engineers coming in” who can relate to the GM case, he says.

A trove of material about the GM debacle already exists, from newspaper articles and technical papers to a painstakingly detailed 315-page report by Anton R. Valukas, a former U.S. attorney whom GM’s new chief executive officer, Mary Barra, hired to investigate the firm’s history with the ignition switch. The probe, completed last May 29, involved some 350 interviews with 230 persons and covered more than 41 million documents, providing a rich vein for instructors and students to mine.

The flawed part made headlines starting last February, when GM recalled some 1.6 million vehicles containing the switch that had been sold worldwide during the mid- and late-2000s. The list included models of the Chevrolet Cobalt and HHR station wagon, the Saturn Ion, the Pontiac G5, the Saturn Sky, and the Pontiac Solstice, the main subject of the 1965 Ralph Nader book, Unsafe at Any Speed. Moreover, compared with these earlier cases, the ignition switch episode appears to have involved more ethics failures by engineers as opposed to marketing gurus, bean counters, executives, or lawyers.

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and that he and his staff of lawyers were asked for "an unvarnished ac-
count." Barra, herself an engineer, accepted the Vlahakis report publicly on
June 5, calling it "extremely thorough, brutally tough, and deeply trou-
bilitating," and had the entire document posted online. At a meeting
with employees, she flagged the episode as an enduring, if encrustat-
ing, learning experience: "I hate sharing this with you as much as you hate
hearing it. But I want you to hear it. In fact, I never want you to
forget it," she told them. "This is not just another business crisis for
GM. We aren't simply going to fix this and move on."

Even before the report's release, GM established a new global
product integrity unit under a vice president, Ken Morris, an engi-
neer, whose job is to look into problems involving safety and quality
performance and make sure they are likely to encounter on the job. For instance, engineers are
ordered to report designs and practices that they believe will injure
or kill people, to follow accepted practices on documenting changes
they propose to help prevent such outcomes, and to follow up
on cases in which a corporate culture fails or refuses to
deal with these problems.

In working the GM case into her courses, Grossen-
bacher plans to focus on questions such as: How did this
debug happen? Why was DeGiorgio able to approve the
design of the flawed ignition switch on his own — and later
replace the part without properly documenting it? Why
did GM's engineering review panel decline to reclassify the
ignition switch malfunction as a full-fledged safety issue
rather than a "customer convenience" concern? How did
GM's corporate culture contribute to what looked like an
internal communication problem? And why did it take
12 years before GM did anything about the flawed part?

Engineering ethics instructors say their primary goal is not to shape
students into puritanical fussbudgets, but rather to give them a moral
framework to use in thinking through workplace situations that ap-
pear to pose ethical problems. Students learn what the ethics codes of
their respective disciplines demand and how they apply to situations
they are likely to encounter on the job. For instance, engineers are
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Among those who have already used the GM case in class is Brian
Patrick Green, assistant director of the Markkula Center for Applied
Ethics at Santa Clara University, who teaches ethics at its School of
Engineering. He started by distributing the introduction and sum-
mary of the Vlahakis report to his students and asking them to write a
review of what they read. "We got varied responses, but mostly they were shocked —
and appalled," Green relates. He's planning to incorporate the GM case
into courses for graduate students. "It's just right to get it in there as
a contemporary issue," he says. "This one has the potential to become
a classic case."

Michael Gorman, a professor of engineering and society at the
University of Virginia School of Engineering and Applied Science,
plans to use the GM story in an engineering ethics course for se-
niors in January, although not in the full-fledged case-study format
he adopts for the Challenger incident.

To Gorman, the GM affair exemplifies two kinds of organizational
dysfunction: first, a dangerously diluted chain of responsibility within
the company, and, second, "the lack of a clear decision-maker" who
might have focused early on finding the problems that the flawed igni-
tion switch posed and then quickly taken steps to resolve them.

"I'd like to have students discuss whether this represents an ethical
decision or an engineering decision," Gorman says. Later, he'll build
a more traditional academic case study, which crafts a similar set of facts
and documents, so that students get the GM experience—and
have students put themselves in the places of the key participants.

"It's an exercise in applied ethical reasoning," he says.

Academics who have not yet explored the GM case in depth never-
theless agree it offers plenty of questions worth exploring. Instruc-
tors could focus on a narrow slice of the case—the design aspects,
or the manufacturing procedures, or even the role of GM's corporate
culture—says Petroski. The role of Mary Barra herself, as a career
GM employee, is worth examining. Petroski notes that she has been
"forthright" and "shown decisiveness" in handling the scandal. "You
can shorten the case-study presentation considerably, and look for
patterns," Petroski suggests. "What are the common features you en-
counter here? What made this happen?"

To Patricia Werhane, a professor of business ethics at DePaul
University, the GM debacle is "a great case of how people develop
blind spots"—and an interesting twist on the different mind-sets that
engineers and managers traditionally use in handling the kinds of
problems that GM encountered in the ignition switch affair.

"Managers usually say, If you can't prove it's wrong, then we go
ahead," Werhane says. "In case studies, they know there were
problems, but their warnings were ignored, and they didn't push
it any further. At GM, the engineers didn't say anything."

Despite the wealth of detail now available, there are concerns about
moving too quickly to build a case-study out of an engineering con-
trony that's still evolving —especially one such as the GM debacle,
which has been more than a dozen years in the making and still is
running through the court system. Although the drama of the case
may pique students' interest at the moment, instructors risk the pos-
sibility that further investigations may prove some of the accepted
accounts of what happened to be wrong. Participants may still be reluctant to discuss the imbroglios. Academics could face criti-
cism for sloppiness, or even libel.

There are going to be lawsuits over this, so it's not inconceivable that
GM is going to be holding back information or asking that the
records be sealed," Duke's Petroski says. "If so, then all those poten-
tially valuable 'lessons learned' haven't been revealed." Ronald Arkin,
a professor at Georgia Tech's College of Computing, agrees. "This is
a case in progress," says Arkin, who teaches ethics to engineering stu-
dents as part of a course on Robots and Society.

Michael Davis, who teaches engineering ethics at the Illinois Insti-
tute of Technology, insists the GM case is ripe enough for picking. Da-
vis, who warned in an ASEE paper in 2006 that it was too soon to turn
the Hurricane Katrina flooding of the previous year into a case study
on engineering ethics, doesn't share the hesitancy about the GM affair.

In the Katrina case, Davis recalls, there wasn't yet enough informa-
tion to support any conclusions, and new facts were emerging every
day. In the GM affair, he says, "it seems like most of the information is
already in," so "you can talk about it now." He calls the report a "valu-
able contribution, not only to engineering ethics, but to engineering."

The here-and-now dimension of the GM case makes it particu-
larly compelling for Grossenbacher. "Here's what I worry about with engineering ethics," she says. "I think there are too many times when
people rely on old cases. Everybody uses them. I feel that we need to
show students that this kind of thing is something that is still going
on and that is something they may well encounter—so they'd better
start thinking about it." Besides, it's almost unavoidable. In class,
the GM ignition switch is "the elephant in the room." Mary Barra, for
one, seems to agree that it belongs there. As she told GM employees
this week, "I want to keep this painful experience permanently in our collec-
tive memories."