Engineering Ethics Seminar
JSC - NASA
2015

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NLT Management Services

Two Ethics Rules

- **Engineers Shall Protect the Public**

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- **Engineers Shall Protect the Public**
- **Engineers Shall Act as Faithful Agents for their Employers and for their Clients**

Engineering Ethics Seminar

Objectives

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Fulfill the Texas P.E. requirement of 1 hour per year of ethics review by:

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- **Reviewing key sections of the Texas Engineering Practice Act.**

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Fulfill the Texas P.E. requirement of 1 hour per year of ethics review by:

- **Reviewing key sections of the Texas Engineering Practice Act.**
- **Review case studies relating to professional ethics.**

Chapter 1001.004 (c)

The legislature intends that:

1. **The privilege of practicing engineering be entrusted only to a person licensed and practicing under this chapter;**

Chapter 1001.004 (c)

The legislature intends that:

2. **Only a person licensed under this chapter may:**

Chapter 1001.004 (c)

The legislature intends that:

2. **Only a person licensed under this chapter may:**

   (A) engage in the practice of engineering;

Chapter 1001.004 (c)

The legislature intends that:

2. Only a person licensed under this chapter may:

(A) engage in the practice of engineering;

(B) be represented in any way as any kind of “engineer”; or

Chapter 1001.004 (c)

The legislature intends that:

2. Only a person licensed under this chapter may:

(A) engage in the practice of engineering;

(B) be represented in any way as any kind of “engineer”; or

(C) make any professional use of the term “engineer.”

Chapter 1001.004 (c)

The legislature intends that:

3. **This chapter will be strictly complied with and will be strictly enforced.**

Chapter 1001 Subchapter B

An exception to the
Texas Engineering Practice Act

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Texas Engineering Practice Act

- **NASA – to the extent that products or services consist of “space” technology, vehicles or services. 1001.066**

Responsiblity:

- **A licensed professional engineer must be in responsible charge whenever engineering services are offered or provided to the public.**

Responsibility:

- **A licensed professional engineer must be in responsible charge whenever engineering services are offered or provided to the public.**

- **The individual and firm offering or providing engineering must be registered with the State of Texas.**

Chapter 137.17:
Continuing Education

Continuing education required for license renewal:

- **15 PDH required annually.**
- **15 PDH can be carried forward. (but not ethics!)**

Continuing Education Credits

Professional Development Hour (PDH)

- **1 College Semester Hour = 15 PDH**
- **1 College Quarter Hour = 10 PDH**
- **1 Hour Self Study = 1 PDH**
- **1 Hour Seminar = 1 PDH**
- **Published Work = 10 PDH**
- **Active Prof. Organization Affiliation = 1 PDH**
- **Each Patent Issued = 15 PDH**

Continuing Education Unit (CEU)

- **1 CEU = 10 PDH**

Chapter 137.17:
Continuing Education

Continuing education required for license renewal:

- **Subject matter shall be relevant to the practice of a technical profession and may include technical, ethical or managerial content.**

Chapter 137.17:
Continuing Education

Continuing education required for license renewal:

- **Subject matter shall be relevant to the practice of a technical profession and may include technical, ethical or managerial content.**
- **Can include formal courses, seminars, publications, presentations and professional society participation.**

Chapter 137.17:
Continuing Education

Continuing education required for license renewal:

- **A license holder may not receive more that five continuing education hours annually for engaging in self-directed study.**

Chapter 137.17:
Continuing Education

Continuing education required for license renewal:

- **A license holder may not receive more that five continuing education hours annually for engaging in self-directed study.**
- **Records must be maintained for 3 years.**

Chapter 137.17:
Continuing Education

Continuing education required for license renewal:

- **1 PDH required annually in professional ethics, rolls and responsibilities for professional engineering or a review of the Texas Engineering Practice Act and Board Rules. (can not carry over this credit)**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.51 General Practice

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- **Compliance with the Board's rulings is required.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.51 General Practice

- **Professional conduct rules apply to all licensed engineers and firms.**
- **Cooperation with the Board is required.**
- **Compliance with the Board's rulings is required.**
- **No licensed engineer can work with an unlicensed or improperly licensed firm.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.51 General Practice

- **Licensed engineers may offer services on a full or part-time basis if done through a licensed firm.**

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Professional Conduct and Ethics

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- **Note: Your full-time employer will not appreciate you performing part-time engineering services under their firm's registration.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.51 General Practice

- **Licensed engineers may offer services on a full or part-time basis if done through a licensed firm.**
- **Note: Your full-time employer will not appreciate you performing part-time engineering services under their firm's registration.**
- **You can and should obtain a Sole Proprietorship registration under which you can perform your part-time work.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.53 Engineer Standard of Compliance

- **Licensed engineers will not request or submit a competitive bid for services to a governmental entity unless specifically authorized by law.**

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- **Requests for bids from governmental agencies must be reported to the Board.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

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- **Requests for bids from governmental agencies must be reported to the Board.**
- **Cost information may be shared as part of contract negotiation.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.53 Engineer Standard of Compliance

- **Licensed engineers will not request or submit a competitive bid for services to a governmental entity unless specifically authorized by law.**
- **Requests for bids from governmental agencies must be reported to the Board.**
- **Cost information may be shared as part of contract negotiation.**
- **Competitive bidding in the private sector is not prohibited.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.55 Engineers Shall Protect the Public

- **"Licensed engineers shall be entrusted to protect the health, safety, property, and welfare of the public in the practice of their profession."**

Chapter 137 Subchapter C:
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- **"Licensed engineers shall be entrusted to protect the health, safety, property, and welfare of the public in the practice of their profession."**
- **Any incompetence, gross negligence or criminal violation constitutes misconduct.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.55 Engineers Shall Protect the Public

- **"Licensed engineers shall be entrusted to protect the health, safety, property, and welfare of the public in the practice of their profession."**
- **Any incompetence, gross negligence or criminal violation constitutes misconduct.**
- **Any risk to the public must be reported to the "involved parties" and the TBPE.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.55 Engineers Shall Protect the Public

- **"Licensed engineers shall be entrusted to protect the health, safety, property, and welfare of the public in the practice of their profession."**
- **Any incompetence, gross negligence or criminal violation constitutes misconduct.**
- **Any risk to the public must be reported to the "involved parties" and the Board.**
- **Engineers should strive to adequately examine the environmental impact of their actions.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.57 Engineers Shall Be Objective and Truthful

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- **Issue statements only in an objective and truthful manner.**

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- **Fraudulent, deceitful, or misleading statements constitutes misconduct.**

Chapter 137 Subchapter C: Professional Conduct and Ethics

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- **Issue statements only in an objective and truthful manner.**
- **Fraudulent, deceitful, or misleading statements constitutes misconduct.**
- **Conflicts of interest must be disclosed.**

Chapter 137 Subchapter C: Professional Conduct and Ethics

137.57 Engineers Shall Be Objective and Truthful

- **A conflict of interest exists whenever an engineer's own interests may be affected by any of their decisions or actions.**

Chapter 137 Subchapter C: Professional Conduct and Ethics

137.57 Engineers Shall Be Objective and Truthful

A conflict of interest exists whenever an engineer's own interests may be affected by any of their decisions or actions.

- **An assignment with a conflict of interest may be done if the conflict of interest disclosure and client/employer acceptance is documented in writing.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.59 Engineers' Actions Shall Be Competent

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- **Engineers shall practice only in their areas of competence.**
- **An engineer may accept assignments outside their area of competence if those phases are done by legally qualified consultants, associates, or employees.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.59 Engineers' Actions Shall Be Competent

- **Engineers shall practice only in their areas of competence.**
- **An engineer may accept assignments outside their area of competence if those phases are done by legally qualified consultants, associates, or employees.**
- **Engineering opinions in court (etc) must be consistent with accepted principles and/or supported by adequate modeling or analysis.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.61 Engineers Shall Maintain Confidentiality of Clients

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- **Confidential information may be revealed with the client's consent or as required by law.**

Chapter 137 Subchapter C:
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137.61 Engineers Shall Maintain Confidentiality of Clients

- **Confidential information may be revealed with the client's consent or as required by law.**
- **Confidential information may also be revealed if failure to disclose would constitute a threat to the public's health, safety, or welfare.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.63 Engineers' Responsibility to the Profession

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- **Be honest and ethical in the professional and business activities.**

Chapter 137 Subchapter C:
Professional Conduct and Ethics

137.63 Engineers' Responsibility to the Profession

- **Be honest and ethical in the professional and business activities.**
- **Strive to enhance the image of engineers and encourage ethical conduct among engineers.**

End of the Review

And now, a review of some couple of case studies.

Credit for Material

Thank you to the Texas A&M University
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The information for this presentation
was obtained on the WEB
Under Engineering Ethics

Scenario No. 1

To Speak Up

Or NOT

When and How to Speak Up

You are Tim West and you work for ACE Machinery (ACEM) as a project engineer. ACEM supplies sophisticated flight equipment and service to the aero-space industry.

When and How to Speak Up

You are Tim West and you work for ACE Machinery (ACEM) as a project engineer. ACEM supplies sophisticated flight equipment and service to the aero-space industry.

Prime Flight Specialists (PFS) is one of your major customers which has done a great deal of business with ACME over the past few years.

When and How to Speak Up

Harold Wright is PFS's project engineer, with whom you have been working on the most recent project. Harold contacted you about a problem that PFS encountered with your latest order.

When and How to Speak Up

Harold Wright is PFS's project engineer, with whom you have been working on the most recent project. Harold contacted you about a problem that PFS encountered with your latest order.

ACEM had shipped a flight controller to Saudi Arabia for installation by PFS on a military aircraft. The PFS service people flew to Saudi to install the controller, but they could not get it to operate correctly.

When and How to Speak Up

Luckily, the faulty controller was switched with another controller which was scheduled for later installation on a similar aircraft in the UAE. After a week delay, the Saudi installation was completed and the faulty controller was returned to ACEM.

When and How to Speak Up

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Harold requested a meeting to discuss how the faulty flight controller could have been shipped with a problem.

When and How to Speak Up

The meeting was setup at ACEM and is just about to start - - -

When and How to Speak Up

The meeting was setup at ACEM and is just about to start - - -

Attending the meeting were:

- **Me, Tim West, the ACEM Project Engineer**
- **Harold Wright, PFS, Project Engineer**
- **Nick Pain, the ACEM Returned Goods Manager**
- **Sharon Apple, the ACEM Engineering Manager**

When and How to Speak Up

After introductions, Harold Wright started the discussion a with a summary of events that lead up to returning the flight controller.

When and How to Speak Up

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Nick Pain then followed the discussion with the results of re-testing the returned flight controller.

When and How to Speak Up

Nick Pain stated that the flight controller passed all of the equipment tests and and that calibration was right on. The problem must have been something to do with the installation procedures.

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But to promote good relations, a new unit would be sent at no cost to replace the unit that had been borrowed from the UAE project.

When and How to Speak Up

Nick Pain stated that the flight controller passed all of the equipment tests and and that calibration was right on. The problem must have been something to do with the installation procedures.

But to promote good relations, a new unit would be sent at no cost to replace the unit that had been borrowed from the UAE project.

Sharon Apple agreed with replacing the flight controller at ACEM's expense.

When and How to Speak Up

You, Tim West, are intimately familiar with this equipment and after listening to Harold's description of events and Nick's explanation of re-testing the flight controller

When and How to Speak Up

You, Tim West, are intimately familiar with this equipment and after listening to Harold's description of events and Nick's explanation of re-testing the flight controller, you feel uneasy with the way the return was handled.

When and How to Speak Up

You are aware of a recent sequence of computer program changes to this model of flight controller,

When and How to Speak Up

You are aware of a recent sequence of computer program changes to this model of flight controller, and you believe that this controller had been shipped with the revision 2 change which had a problem similar to what Harold Wright had described

When and How to Speak Up

You are aware of a recent sequence of computer program changes to this model of flight controller, and you believe that this controller had been shipped with the revision 2 change which had a problem similar to what Harold Wright had described, and not with the revision 3 corrected program.

When and How to Speak Up

You feel that you have to speak up.

When and How to Speak Up

You feel that you have to speak up.

But – company stand appears to be to disown any blame

When and How to Speak Up

You feel that you have to speak up.

But – company stand appears to be to disown any blame, and Nick's response to the testing has been supported by Sharon's agreement.

When and How to Speak Up

WHAT SHOULD YOU DO ???

When and How to Speak Up

You decide to keep quiet at the meeting but to follow up with Nick after the meeting.

When and How to Speak Up

You decide to keep quiet at the meeting but to follow up with Nick after the meeting.

You meet with Nick right after Harold leaves the building. You talk to him about the computer program changes and how shipping the controller with revision 2 in-place would have accounted for what the PFS installers experienced.

When and How to Speak Up

Nick agrees – there was a problem, but by admitting the quality check oversight would have jeopardized ACEM reputation to the industry.

When and How to Speak Up

Nick agrees – there was a problem, but by admitting the quality check oversight would have jeopardized ACEM reputation to the industry.

Nick also said that he had explained the situation to Sharon Apple and to members of upper management before the meeting.

When and How to Speak Up

Nick agrees – there was a problem, but by admitting the quality check oversight would have jeopardized ACEM reputation to the industry.

Nick also said that he had explained the situation to Sharon Apple and to members of upper management before the meeting.

All agreed to not mention the problem and to move on.

When and How to Speak Up

What do you think of the ACEM resolution to the problem?

When and How to Speak Up

Assume you decide to stay with ACEM and in a few years you are placed into a responsible management position.

When and How to Speak Up

Assume you decide to stay with ACEM and in a few years you are placed into a responsible management position.

How do you think this scenario will affect your management decision-making?

When and How to Speak Up

Do you take the company line? -

Anything Goes for the Company!

When and How to Speak Up

Do you take the company line? -

Anything Goes for the Company!

Or do you start an open campaign to bring a Truthful and Ethical culture to ACEM?

When and How to Speak Up

How do you think your approach will be accepted:

When and How to Speak Up

How do you think your approach will be accepted:

- **By Upper Management?**

When and How to Speak Up

How do you think your approach will be accepted:

- **By Upper Management?**
- **By the people under you?**

When and How to Speak Up

How do you think your approach will be accepted:

- **By Upper Management?**
- **By the people under you?**
- **By the customers?**

Another Scenario

Don’t Fix It

If It’s Not Broken

Don’t fix it if it’s not broken

Carl Lawrence was somewhat nervous on his first day at work. He is right out of college and he starting right in as a unit supervisor at Emerson Chemical, a small to mid-size production facility.

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Don’t fix it if it’s not broken

Carl Lawrence was somewhat nervous on his first day at work. He is right out of college and he starting right in as a unit supervisor at Emerson Chemical, a small to mid-size production facility.

Plant manager, Kevin Rourke, gave Carl a tour of the facilities and introduced him to the workers he will be supervising.

Don’t fix it if it’s not broken

Carl was pleasantly surprised when he was introduced to Rick Duffy. Rick and Carl's older brother were best friends in high school, and Carl had always liked Rick.

Don’t fix it if it’s not broken

Carl was pleasantly surprised when he was introduced to Rick Duffy. Rick and Carl's older brother were best friends in high school, and Carl had always liked Rick.

When Kevin Rourke finished showing Carl around the facilities, he asked Rick to show Carl the acid and the caustic distribution systems, which are two of the units that Carl will be supervising.

Don’t fix it if it’s not broken

During the unit tour, Carl noted a striking safety differences in the two units. The acid system:

Don’t fix it if it’s not broken

During the unit tour, Carl noted a striking safety differences in the two units. The acid system:

- Has spring loaded valves that close automatically when not in use and operation and emergency level alarms.

Don’t fix it if it’s not broken

During the unit tour, Carl noted a striking safety differences in the two units. The acid system:

- Has spring loaded valves that close automatically when not in use and operation and emergency level alarms.
- Has a dead-man switch which must be held at the remote location in order to operate the hydrochloric acid tank fill valve.

Don’t fix it if it’s not broken

During the unit tour, Carl noted a striking safety differences in the two units. The acid system:

- Has spring loaded valves that close automatically when not in use and operation and emergency level alarms.
- Has a dead-man switch which must be held at the remote location in order to operate the caustic tank fill pump.
- Has a posted penalty signs – ‘defeating the dead-man switch is cause for immediate dismissal.’

Don’t fix it if it’s not broken

During the unit tour, Carl noted a striking safety differences in the two units. The acid system:

- Has spring loaded valves that close automatically when not in use and operation and emergency level alarms.
- Has a dead-man switch which must be held at the remote location in order to operate the caustic tank fill pump.
- Has a posted penalty signs – ‘defeating the dead-man switch is cause for immediate dismissal.’
- Has overflow an containment around the tank.

Don’t fix it if it’s not broken

During the unit tour, Carl noted a striking safety differences in the two units. The acid system:

- Has spring loaded valves that close automatically when not in use and operation and emergency level alarms.
- Has a dead-man switch which must be held at the remote location in order to operate the caustic tank fill pump.
- Has a posted penalty signs – ‘defeating the dead-man switch is cause for immediate dismissal.’
- Has overflow an containment around the tank.
- Has High and Low Level instrumentation for operating and emergency level alarming and control.

Don’t fix it if it’s not broken

In contrast, the caustic system:

Don’t fix it if it’s not broken

In contrast, the caustic system:

- Has no similar safety systems.

Don’t fix it if it’s not broken

In contrast, the caustic system:

- Has no similar safety systems.
- Has LOW and LOW-LOW Level operating alarms, but has no HI level alarms.

Don’t fix it if it’s not broken

In contrast, the caustic system:

- Has no similar safety systems.
- Has LOW and LOW-LOW level alarms, but has no HI level alarms.
- Has tank vent lines that were piped to trench drains in the floor,

Don’t fix it if it’s not broken

In contrast, the caustic system:

- Has no similar safety systems.
- Has LOW and LOW-LOW level alarms, but has no HI level alarms.
- Has tank vent lines that were piped to trench drains in the floor, which are connected directly to the public water sewers which then flow to the public water treatment plant (WTP).

Don’t fix it if it’s not broken

Carl asked Rick about the differences …

Don’t fix it if it’s not broken

Carl asked Rick about the differences and Rick replied;

- The acid system is used more, so it is probably more important.

Don’t fix it if it’s not broken

Carl asked Rick about the differences and Rick replied;

- The acid system is used more, so it is probably more important.
- It’s been that way since I got here.

Don’t fix it if it’s not broken

Carl asked if the operators have written operating instructions, and whether the operators were trained.

Don’t fix it if it’s not broken

Carl asked if the operators have written operating instructions, and whether the operators were trained.

Rick replied:

- That he had never seen any operating instructions.

Don’t fix it if it’s not broken

Carl asked if the operators have written operating instructions, and whether the operators were trained.

Rick replied:

- That he had never seen any operating instructions.
- He is not aware of any operator training.

Don’t fix it if it’s not broken

Carl asked if Rick was satisfied with this.

Don’t fix it if it’s not broken

Carl asked if Rick was satisfied with this.

Rick replied:

- He had no problem with it.

Don’t fix it if it’s not broken

Carl asked if Rick was satisfied with this.

Rick replied:

- He had no problem with it.
- The way the plant is run is someone else’s problem, not his.

Don’t fix it if it’s not broken

Carl asked if Rick was satisfied with this.

Rick replied:

- He had no problem with it.
- The way the plant is run is someone else’s problem, not his.
- I suppose that they don’t want to invest any money into a system which is working just fine.

Don’t fix it if it’s not broken

What should Carl do?

Don’t fix it if it’s not broken

What should Carl do?

Should he talk to Kevin about his concerns with safety, health and environmental?

Don’t fix it if it’s not broken

This is Carl’s first job out of college and he doesn’t want to make waves,

Don’t fix it if it’s not broken

This is Carl’s first job out of college and he doesn’t want to make waves, so he just gets busy learning his new job responsibilities.

Don’t fix it if it’s not broken

This is Carl’s first job out of college and he doesn’t want to make waves, so he just gets busy learning his new job responsibilities.

Perhaps there are good reasons whey the units are not the same.

Don’t fix it if it’s not broken

Five months later, at around noon Carl Lawrence receives an urgent message from the chief operator that the Low Level alarm has sounded in the caustic supply tank.

Don’t fix it if it’s not broken

Five months later, at around noon Carl Lawrence receives an urgent message from the chief operator that the Low Level alarm has sounded in the caustic supply tank.

Carl knows that the tank was recently filled. He calls Keven to alert him of the alarm.

Don’t fix it if it’s not broken

Kevin Rourke instructs all supervisors in the plant to immediately check for open caustic valves. The caustic supply tank is almost empty. We have either an open valve or a leak.

Don’t fix it if it’s not broken

Kevin Rourke instructs all supervisors in the plant to immediately check for open caustic valves. The caustic supply tank is almost empty. We have either an open valve or a leak.

This will soon affect production - he orders an emergency purchase of more caustic to keep the plant operating.

Don’t fix it if it’s not broken

Carl immediately tells his lead operators to check for a cause of the leak in the caustic distribution system.

Don’t fix it if it’s not broken

Carl immediately tells his lead operators to check for a cause of the leak in the caustic distribution system.

In 30 minutes they report that everything is in order and no cause was found.

Don’t fix it if it’s not broken

Carl immediately tells his lead operators to check for a cause of the leak in the caustic distribution system.

In 30 minutes they report that everything is in order and no cause was found.

An hour later they receive a emergency LOW-LOW Level alarm from the caustic supply tank.

Don’t fix it if it’s not broken

At 4:00pm a lead operator who has just arrived for the afternoon shift notices an open valve in a seldom used area of the caustic unit.

Don’t fix it if it’s not broken

At 4:00pm a lead operator who has just arrived for the afternoon shift notices an open valve in a seldom used area of the caustic unit.

Carl had forgotten that no one was working on that side of the unit during the early afternoon. So, the seldom used valve wasn't checked.

Don’t fix it if it’s not broken

At 4:00pm a lead operator who has just arrived for the afternoon shift notices an open valve in a seldom used area of the unit.

Carl had forgotten that no one was working on that side of the unit during the early afternoon. So, the seldom used valve wasn't checked.

Now however, Carl remembers that Rick Duffy was assigned that area during the previous shift.

Don’t fix it if it’s not broken

The open caustic valve is immediately shut off.

Don’t fix it if it’s not broken

Carl realizes that the open valve had sent the caustic to a small caustic sample tank. The sample tank had quickly overflowed to the floor drain.

Don’t fix it if it’s not broken

Then Carl phones Rick:

Don’t fix it if it’s not broken

Then Carl phones Rick: "Rick, you left the C-2 valve open; and we've got a real problem on our hands.

Don’t fix it if it’s not broken

Then Carl phones Rick: "Rick, you left the C-2 valve open; and we've got a real problem on our hands. We've lost almost all of our caustic and it went down the floor drain.

Don’t fix it if it’s not broken

Then Carl phones Rick: "Rick, you left the C-2 valve open; and we've got a real problem on our hands. We've lost almost all of our caustic and it went down the floor drain.

What time was it when you opened the valve?"

Don’t fix it if it’s not broken

Rick responds: "Carl, I don't remember. I was real tired all day.

Don’t fix it if it’s not broken

Rick responds: "Carl, I don't remember. I was real tired all day. I pulled an all-nighter getting ready for my night school exam tonight, and I was just wiped out when I went to work.

Don’t fix it if it’s not broken

Rick responds: "Carl, I don't remember. I was real tired all day. I pulled an all-nighter getting ready for my night school exam tonight, and I was just wiped out when I went to work. I think I turned it on near the end of my shift, but I just can't be sure….. I can't believe I forgot to turn it off!"

Don’t fix it if it’s not broken

Rick pauses and takes a deep breath,

Don’t fix it if it’s not broken

Rick continues: "Man, I can't afford trouble right now.”

Don’t fix it if it’s not broken

Rick continues: "Man, I can't afford trouble right now.”

“Jan's pregnant again,

Don’t fix it if it’s not broken

Rick continues: "Man, I can't afford trouble right now.”

“Jan's pregnant again, and I've got another semester to go before I graduate."

Don’t fix it if it’s not broken

What should Carl do?

Don’t fix it if it’s not broken

What should Carl do?

Should he tell Kevin who left the caustic valve open?

Don’t fix it if it’s not broken

Kevin Rourke is relieved to learn that the problem is an open valve rather than a tank or valve leak.

Don’t fix it if it’s not broken

Kevin Rourke is relieved to learn that the problem is an open valve rather than a tank or valve leak.

They didn’t have to stop production and no repairs would be required.

Don’t fix it if it’s not broken

Kevin Rourke is relieved to learn that the problem is an open valve rather than a tank or valve leak.

They didn’t have to stop production and no repairs would be required.

However, another decision is necessary.

Don’t fix it if it’s not broken

Since it is not known how long the valve was open, there is some uncertainty about how much caustic waste has been released

Don’t fix it if it’s not broken

Since it is not known how long the valve was open, there is some uncertainty about how much caustic waste has been released and, if any has reached the publicly owned WTP wastewater treatment plant.

Don’t fix it if it’s not broken

It is estimated that it takes 6 hours for liquid waste from Emerson Chemical to arrive at WTP.

Don’t fix it if it’s not broken

It is estimated that it takes 6 hours for liquid waste from Emerson Chemical to arrive at WTP.

If the valve had been opened near the end of shift, there would still be time to arrange for a supply of acid to be delivered to WTP to counter the higher pH that the caustic waste would cause.

Don’t fix it if it’s not broken

It is estimated that it takes 6 hours for liquid waste from Emerson Chemical to arrive at WTP.

If Rick turned on the valve shortly before he left work, there would still be time to arrange for a supply of acid to be delivered to WTP to counter the higher pH that the caustic waste would cause.

Even if the valve was opened earlier, sending the acid to WTP would help control the situation.

Don’t fix it if it’s not broken

Kevin knew that WTP had been having problems with their in-flow pH monitor, which has been out of service for the past week.

Don’t fix it if it’s not broken

Kevin knew that WTP had been having problems with their in-flow pH monitor, which has been out of service for the past week.

He also knew that the meter would be still be out of service for a few more days.

Don’t fix it if it’s not broken

Kevin knew that WTP had been having problems with their in-flow pH monitor, which has been out of service for the past week.

He also knew that the meter would be still be out of service for a few more days. So, even if the caustic waste were to raise the pH to an unacceptable level, it would be difficult, if not impossible, to trace the problem to Emerson Chemical.

Don’t fix it if it’s not broken

What should Kevin do?

Don’t fix it if it’s not broken

What should Kevin do?

If he does notify the proper outside authorities, how candid should he be in estimating how much caustic waste has been released?

Don’t fix it if it’s not broken

Kevin Rourke notifies the local Emergency Management office, who then alert WTP.

Don’t fix it if it’s not broken

Kevin Rourke notifies the local Emergency Management office, who then alert WTP.

Kevin also immediately arranges for a large supply of hydrochloric acid to be taken to WTP in case it is needed.

Don’t fix it if it’s not broken

Although the entire incident is quite costly, Kevin is convinced he has acted correctly:

Don’t fix it if it’s not broken

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If Kevin had done nothing, it's possible nothing terrible would have resulted. But it would have been a very risky thing.

.

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Although the entire incident is quite costly, Kevin is convinced he has acted correctly:

If Kevin had done nothing, it's possible nothing terrible would have resulted. But it would have been a very risky thing.

If the caustic overflow had killed the micro-organisms that digest the sewage, WTP would have had to report the out-of-compliance discharge to the state Environmental Protection Agency.

Don’t fix it if it’s not broken

If it ever got out that Emerson Chemical was responsible--and that they had tried to cover it up--they would have really paid through the nose.

Don’t fix it if it’s not broken

If it ever got out that Emerson Chemical was responsible--and that they had tried to cover it up--they would have really paid through the nose.

Kevin would probably have lost his job and Emerson Chemical’s public reputation would really have suffered.

Don’t fix it if it’s not broken

If it ever got out that Emerson Chemical was responsible--and that they had tried to cover it up--they would have really paid through the nose.

Kevin would probably have lost his job and Emerson Chemical’s public reputation would really have suffered.

Total costs to Emerson: Replacement costs for an estimated 2,500 gallons of wasted caustic, and 15 drums of hydrochloric acid and $250,000 to bring the caustic distribution system up to industrial safety standards.

Don’t fix it if it’s not broken

Evaluate Kevin Rourke's actions and supporting rationale from the standpoint of:

- WTP;

Don’t fix it if it’s not broken

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- WTP;
- Emerson Chemical management;

Don’t fix it if it’s not broken

Evaluate Kevin Rourke's actions and supporting rationale from the standpoint of:

- WTP;
- Emerson Chemical management;
- Emerson Chemical stockholders;

Don’t fix it if it’s not broken

Evaluate Kevin Rourke's actions and supporting rationale from the standpoint of:

- WTP;
- Emerson Chemical management;
- Emerson Chemical stockholders;
- Other industries in the area that use WTP;

Don’t fix it if it’s not broken

Evaluate Kevin Rourke's actions and supporting rationale from the standpoint of:

- WTP;
- Emerson Chemical management;
- Emerson Chemical stockholders;
- Other industries in the area that use WTP;
- Local citizens.

Don’t fix it if it’s not broken

Do you think Kevin Rourke did the right thing?

Don’t fix it if it’s not broken

Rick Duffy clearly was negligent.

Don’t fix it if it’s not broken

Rick Duffy clearly was negligent.

What should Carl Lawrence do about it?

Don’t fix it if it’s not broken

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If propping open a pump switch of an acid tank warrants immediate termination, should Carl fire Rick for leaving open the caustic valve?

Don’t fix it if it’s not broken

Rick Duffy clearly was negligent.

What should Carl Lawrence do about it?

If propping open a pump switch of an acid tank warrants immediate termination, should Carl fire Rick for leaving open the caustic valve?

To what extent, if any, should Carl be influenced by his friendship with Rick, and his knowledge that Rick needs to keep his job?

Don’t fix it if it’s not broken

Although he realizes Carl Lawrence was not responsible for leaving the valve open, Kevin Rourke is upset that it took Carl's unit so long to discover the problem.

Don’t fix it if it’s not broken

Although he realizes Carl Lawrence was not responsible for leaving the valve open, Kevin Rourke is upset that it took Carl's unit so long to discover the problem.

Why, he wonders, didn't anyone check C-2 in this emergency situation?

Don’t fix it if it’s not broken

Although he realizes Carl Lawrence was not responsible for leaving the valve open, Kevin Rourke is upset that it took Carl's unit so long to discover the problem.

Why, he wonders, didn't anyone check C-2 in this emergency situation?

Kevin ponders what he should say to Carl--and whether he should take any action against him.

Don’t fix it if it’s not broken

What should Kevin do?

Don’t fix it if it’s not broken

The next morning Carl Lawrence is mulling over what he is going to say to Rick Duffy when he hears a knock on his door.

Don’t fix it if it’s not broken

The next morning Carl Lawrence is mulling over what he is going to say to Rick Duffy when he hears a knock on his door.

He is surprised to see Rick, and he is even more surprised at what Rick has to say:

Don’t fix it if it’s not broken

The next morning Carl Lawrence is mulling over what he is going to say to Rick Duffy when he hears a knock on his door.

He is surprised to see Rick, and he is even more surprised at what Rick has to say: "I know I really put you in a tough spot. I'm really sorry I let you down. I want you to know that I quit this morning, so you don't have to fire me….

Don’t fix it if it’s not broken

… I've already applied for another job.

Don’t fix it if it’s not broken

… I've already applied for another job.”

“Look, Carl, I know I shouldn't be asking you for any favors, but I need a couple of references.

Can I count on you?“

Don’t fix it if it’s not broken

What should Carl say to Rick?

Don’t fix it if it’s not broken

What should Carl say to Rick?

What should he do?

Don’t fix it if it’s not broken

What should Carl say to Rick?

What should he do?

If he writes a letter of recommendation, what should he say about Rick's work performance?

Don’t fix it if it’s not broken

When he receives a call from Carl’s perspective new employer, what should he say?

Don’t fix it if it’s not broken

When he receives a call from Carl’s perspective new employer, what should he say?

The HR rep from Rick’s potential new employer calls Carl and wants to know more about Rick’s job history. What should Carl tell her?

Don’t fix it if it’s not broken

This ends the scenario.

Don’t fix it if it’s not broken

This ends the scenario.

Where do you feel the real root causes for this incident reside?

Don’t fix it if it’s not broken

This ends the scenario.

Where do you feel the real root causes for this incident reside?

Do these root causes involve ethics?

IT IS TIME TO

HEAR IT AGAIN !!

Fundamental P.E. Canons

1. **Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.**

Fundamental P.E. Canons

2. Engineers shall perform services only in their area of competence.

Fundamental P.E. Canons

3. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional development of those engineers under their supervision.

Fundamental P.E. Canons

4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.

Fundamental P.E. Canons

5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.

Fundamental P.E. Canons

6. Engineers shall associate only with reputable persons or organizations.

Fundamental P.E. Canons

7. Engineers shall issue public statements only in an objective and truthful manner.

P.E. Ethics Rule #1

P.E. Ethics Rule #1

Engineers Shall

Protect the Public !!

Thanks for attending!

Your attendance will be recorded in Satern