

A Case Study in Organizational Learning

Learn, Share, Be Fair:
An Analysis of the Investigation of
Chino Valley Independent Fire District's
Water Tender 66 Rollover



This report includes
interactive links
to video clips

By Brad Mayhew
3 September 2010

The Wildland Fire Lessons Learned Center

A lesson is truly learned when we modify our behavior to reflect what we now know.

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This report is available at: http://www.wildfirelessons.net/documents/Chino_Valley_Case_Study.pdf

“

It was nice to see how they [management] looked at the incident in its entirety. This was somewhat of a paradigm shift. They looked at what transpired and asked: ‘Was it a cultural problem?’ ‘Was it a system problem?’

And when they asked those two questions, the answers to both were:

‘Yes.’

Instead of coming after the individual, they looked at what led up to the incident.

Based on their report, we made some changes to our policies, to our procedures, and to our apparatus.

There was no blame handed out to the individual who was driving the water tender. From a union standpoint, that was something that was very positive to see.

The blame can be on the culture, the blame can be on the individual, or the blame can be on the system. It can be on any one of those three.

The lesson that I learned from this is that it’s important [to] look at it from a broad perspective instead of just focusing on one of these three. It can be any one of the three.

”



Captain Pete Roebuck

**Pete Roebuck, Firefighter
Chino Valley Fire District,
President Local 3522 Firefighter’s Union**

[Click to watch Union President Pete Roebuck give his perspective on the investigation.](http://www.myfirevideos.net/Default.aspx?VideoID=425)¹

¹ <http://www.myfirevideos.net/Default.aspx?VideoID=425>

Goals

The case study is based on an actual investigation, which took place in 2008. The members of the investigation team were not trained investigators; they were firefighters with a mission to understand an incident that could have been disastrous. As luck would have it, it was not. What resulted was a spontaneous understanding of the event in terms of conditions, culture, equipment limitations and communications. The underlying construction of the method of the analysis was “Learn, Share and Be Fair”.

This case study is designed to provide information about the investigation results and to ask the reader what effect this approach might have on willingness of personnel to talk to investigators, as well as what effect it might have on accident prevention.

How will the handling of this investigation affect your comfort level to speak openly during future investigations?

“You worry a lot of times about what's going to come down at admin—from the big guys who are going to bring the hammer down. It seems like in the past they're getting more and more strict about laying down harsher punishments. But I must respect the fact that when they do lay those punishments down, it was for a reason.

In this accident, I think a lot of places would have canned Mike or disciplined him in some way because he was the operator of that piece of equipment. He was responsible for it, and it rolled over.

But somebody utilized some common sense and said: ‘Okay, was Mike negligent?’ ‘Did he intentionally do something that our department says we're not supposed to do?’

Obviously, they found that he didn't.

If somebody had got canned, there may be a lot more tight-lipped people next time. It would be harder to investigate something like this in the future.”

**Chuck Kinne, Engineer
Chino Valley Fire District**

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I. Introduction

A. Brief Overview of the Accident and Investigation

While driving Water Tender 66 to a grass fire on April 17, 2008, two firefighters from the Chino Valley Independent Fire Protection District were involved in an off-road rollover accident. The firefighters received minor injuries; Water Tender 66 (WT-66) was a total loss.

District leadership considered this event a serious accident and formed a team to investigate it.² The team's final report focused heavily on organizational and cultural factors, and did not assign blame to the water tender operator. No disciplinary action was taken against this firefighter, who was promoted on schedule to engineer, despite his involvement in the accident.

District leaders and personnel considered this investigation and its follow up actions to be a “paradigm shift,” which contributed to a culture of trust, learning, and safety. The District's review process is consistent with many current academic recommendations on accident investigation and the development of learning, safety, reporting, and just cultures (eg. see Dekker, Reason, Weick and Sutcliffe, Hollnagel, Woods and Cook).

B. The Purpose of This Case Study

Many fire organizations are currently interested in revising or developing post-incident review and investigation practices. Some are shifting toward “blame-free” investigations that focus on organizational and cultural factors. Supporters of this approach expect that employees will be more willing to trust a blame-free process and will talk more frankly about their experiences, which will then lead to a better understanding of accidents and more meaningful improvements in safety.

But what would this really look like, in practice? Would it work, or is this wishful thinking? Do we have evidence that this style of investigation would *actually* lead to learning, trust, and improved safety?

And what would be lost by adopting this approach?

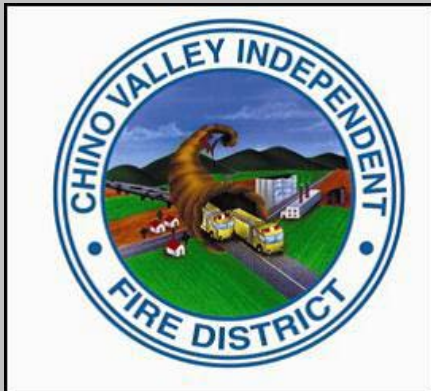
² It is worth noting that terms like “Accident,” “Investigation,” and “Investigation Team” have very specific (and very different) meanings from agency to agency. The reader should be aware that these terms may be used by Chino Valley personnel in ways that differ from the readers' agency. For example, in some organizations, administrative investigations (which may lead to disciplinary action) are kept strictly separate from safety investigations; but this sort of separation was not policy or tradition at Chino Valley.

Might such an approach bring unintended consequences? For example, could this style of review and investigation erode personal responsibility, and thereby *detract* from safety in the long run?

Sometimes, these debates hinge on theory and guesswork, which may be of little use to leaders interested in actionable solutions. And although the fire service has experimented with various styles of accident investigation and review, so far not much has been done to assess the cultural and organizational consequences of these investigations.

This case study will attempt to capture the experiences of one small fire department after their accident. It will explore the approach they took to the accident, the consequences of handling the accident as they did, and how and why they came to this approach in the first place.

The intent of this case study is to offer a real-world example and hopefully contribute to the ongoing dialog on organizational learning, investigation approaches, and just culture.



The Chino Valley Independent Fire District, which began in 1895 as Chino Fire Company No. 1, has grown to include six fire stations that house more than 100 professional firefighters.

The district includes emergency medical and paramedic services, hazardous materials response, and urban search and rescue services.

C. Notable Features of the Water Tender 66 Rollover Accident Investigation Process

- The department's approach to the accident was seen as a "paradigm shift" by the floor personnel and leadership, and by the investigators themselves.
- The small size of the department makes it somewhat manageable to begin asking questions about the cultural effects of the accident investigation process.
- The department's approach concurs with current research and recommendations on organizational learning, system safety, and accident investigation.
- The investigators were not aware of any of this research, nor did they report a conscious attempt to apply any current academic theories.
- This was the first serious accident investigation for all the department personnel on the investigation team.

- Many people in the department—including administrators, investigators, floor personnel, and union representative—were satisfied with the investigation process, the

report, and follow-up actions. So, from various points of view within the organization, this investigation was seen as successful and beneficial.



Perspective from the opposite direction of travel. Note the tire marks in the loose soil. Was the event predictable?

ACCIDENT INVESTIGATION
REPORT



Firefighter Minor Injuries
Single Vehicle Rollover on Vegetation Fire
April 17, 2008
Chino Valley Independent Fire Protection District
CA-CHO-08002990
Cal Fire San Bernardino Unit
CA-BDU-08004142

[Click to read the 2008 Accident Investigation Report produced by Chino Valley FD](http://www.wildfirelessons.net/documents/Chino_Valley_WT66_Investigation2008.pdf)
(http://www.wildfirelessons.net/documents/Chino_Valley_WT66_Investigation2008.pdf)

For a listing of changes Chino Valley Fire District made as a result of their accident investigation, see Appendix E, below.

The Investigation Team responsible for the investigation and report:

Tim Shackelford, Battalion Chief, Chino Valley Fire Protection District – Investigation Administrator
Jeremy Ault, Captain, Chino Valley Fire Protection District – Investigation Technical Specialist, Training and Safety
Scott Atkinson, Captain, Chino Valley Fire Protection District – Investigation Technical Specialist, Training and Safety
Doug Lannon, Battalion Chief, Cal Fire San Bernardino Unit – Investigation Technical Specialist, Investigations and Interviews

One of the things that we really wanted to get out of this was to learn from it. We wanted to look at it really objectively, and once we were done with the objective look at it, what are the lessons here? We wanted to make sure that we learned the lessons, and that whatever lessons we learned, we shared with everybody else.

You know, our cultural history is, “First we’re gonna have us a trial. Then we’re gonna’ have us a hangin’.” We didn’t want to do it that way.

The guy that was driving the vehicle was a great employee. He was trying to do the right thing for the right reasons. How did he get into that position? And is there something we could do as a fire service organization that could help him make a better decision next time?

If we don’t look at why people made those decisions, we’re missing the really important lessons.

-Deputy Ch. Kirk Summers

[Click to watch Ch. Summers and Ch. Shackelford talk about how they approached this accident.](#)³

II How the Chino Valley Fire District Addressed the Rollover Accident

A. The *Learn, Share, Be Fair* Approach

During interviews for this case study, investigation team members and department leaders repeatedly used the terms “learn,” “share,” and “be fair,” so it seems fitting to label the department’s overall handling of their mishap a “*Learn, Share, Be Fair*” Approach. What follows is a compilation of actions and attitudes that fall under each of these three components:

Learn:

The accident investigators and department leaders were motivated to understand the accident because they recognized that the situation had the potential to be much worse—if conditions and circumstances had been slightly different. On the other hand, they also recognized that this could have been a non-event—if conditions and circumstances had been slightly different.

The District’s leaders interpreted this accident as an opportunity to discover areas of potential improvement within their current operational system, in order to prevent such accidents from occurring in the future.

The investigators placed an emphasis on understanding how this rollover happened, why the people involved took the actions that they did, and why these actions made sense to them at the time.

³<http://www.myfirevideos.net/Default.aspx?VideoID=426>

The investigators tried to keep an open mind—they allowed their understanding of the accident to emerge from the facts and perspectives they gathered, and avoided the temptation to simply search for data to verify pre-conceived expectations.

The investigation team included multiple perspectives:

- Three Chino Valley Fire District personnel who had personal experience driving WT-66 and training other firefighters to drive this vehicle.
- A District outsider (Cal Fire Battalion Chief Doug Lannon).
- The investigation was overseen by a District newcomer, Deputy Chief Kirk Summers—who was hired nine months prior to the rollover accident after retiring from a neighboring local fire department.

The investigators produced an accident report that focused on complex factors, including policy, operational risk management procedures, leadership, and cultural attitudes toward risk.

Following the investigation, the District made changes to some of its policies, training, and vehicle engineering specifications. (For a list of specific changes, see Appendix E.)

Share:

Department leaders were committed to openly sharing their lessons:

- Within 24 hours, Ch. Shackelford posted a summary of the accident report on the “Secret List.”⁴
- Approximately one year after the accident, they presented their investigation and lessons learned at the 2009 California Interagency Wildland Safety Officers’ Conference.
- They provided information for this case study, allowing interviews with employees, and providing background documents used in the water tender investigation. District management was generous with their time in answering any questions; nothing was “off the table.”
- They made their report available for public dissemination

Be Fair:

The leaders were not initially committed to avoiding blame or disciplinary action. They wanted to get the full story—and then take action.

They were not initially committed to the idea that this must have been an organizational accident. They tried to approach the accident with an open mind.

They did not believe that being fair required “sugar-coating” the truth.

In evaluating performance, managers tried to put themselves “in the shoes” of the personnel who were making decisions on the ground. They evaluated actions within the context of the actors’ understanding of the situation, and based on cultural norms within the department.

⁴ The “Secret List” is an independent newsletter produced since 1998 by Loveland and Symmes Ohio Fire District Deputy Chief Billy Goldfeder to share issues involving fire services accidents and close calls. The original intent of this e-mail subscription service was to share issues that are typically ignored, quickly forgotten, or just not talked about. See: FirefighterCloseCalls.com

They found that, in this case, many of the actions which at first may have seemed abnormal or erroneous, instead turned out to be consistent with operational culture and made sense given the actors' understanding of their situation at the time (see example below).

In this case, they did not find any actions that they could label "glaringly wrong," when viewed in context.

They chose not to single out an individual for blame.

They concluded that, in this case, the fire district's culture, organization, and leadership all had a share in the responsibility.



"If we had found that Mike had done something wrong, we'd have taken appropriate action.

But that's not what the facts showed."

**Kirk Summers, Deputy Fire Chief
Chino Valley Fire District**

B. Error In and Out of Context, An Example

Apparent Error: "The Water Tender 66 operator should not have driven on the eroded section of the dirt road."

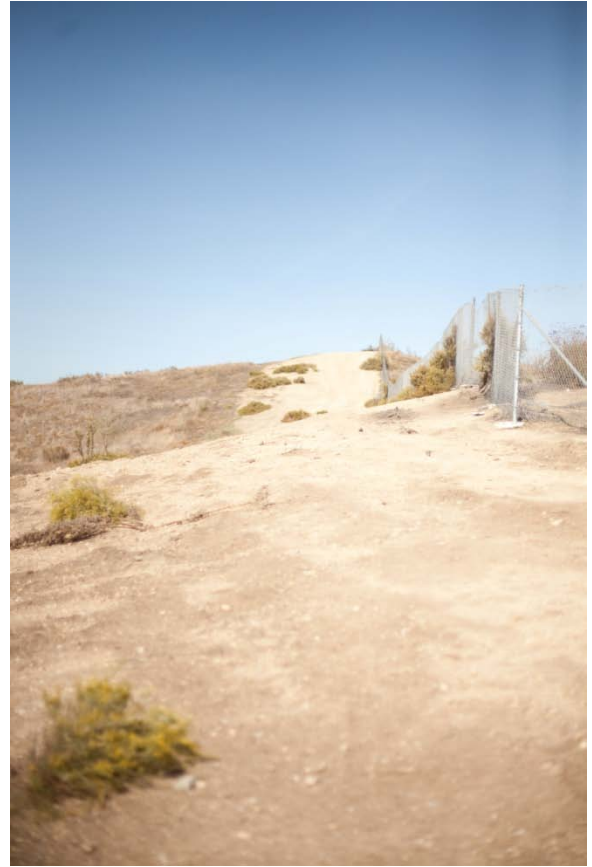
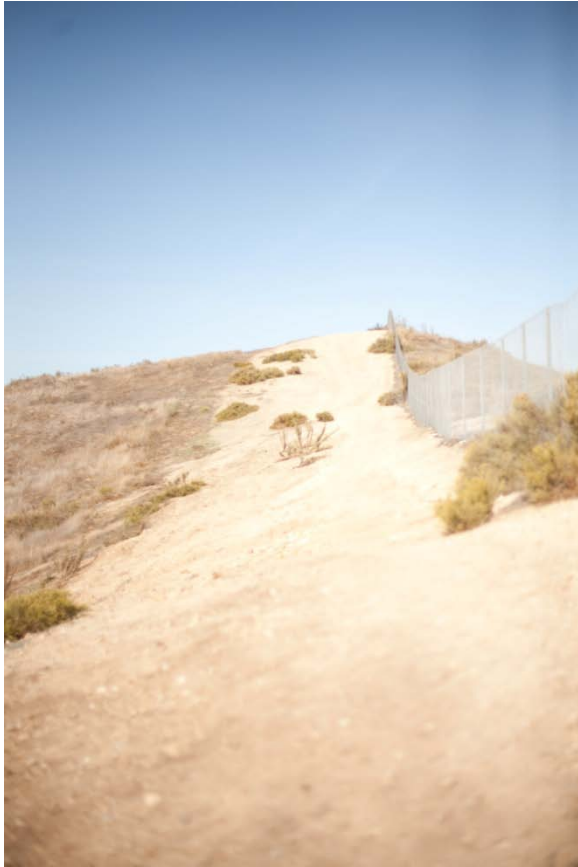
After the rollover of WT-66, it seemed obvious that the operator should not have attempted to drive across the section of dirt road on which he slid and rolled. In light of the outcome, the decision to drive up the eroded road appeared to be a cause of the incident. Yet the investigators sought to understand the driver's perspective. At what point did he choose to do something wrong? He drove the water tender gradually up the hill before cresting the first little rise, then continued driving onto the piece of road in question. As he crested the hill, he was sitting level, and the road that was visible ahead of him was relatively level from side to side and did not cause him to question his course.

The investigators put the decision in context - Given the visibility from the cab of the water tender, it would have been impossible for the driver to see the condition of the road immediately in front of his hood. Maybe he could have rolled down the window, but this would have been contrary to the common practice of keeping windows closed to keep out smoke. They found that the driver was operating the vehicle in a reasonable way, consistent with policy and with normal cultural practice. So what would seem at first like an obvious mistake (driving the water tender on a section of road that couldn't support it), appeared as reasonable action when taken in context.

[Click here to view do a short walkthrough of the accident site with Mike Rabehl \(the operator of](#)

[WT-66 during the rollover](#).⁵

Consider the two following photos:



The photograph on the left shows the obviously slanted section of dirt road, clearly unsafe to drive over. But the photograph on the right (taken from a few yards behind the photograph on the left) is an approximation of the driver's perspective just before driving onto the slanted section of the dirt road.

The road as seen in the left hand photograph is steeply slanted, but this is not how the road appeared to the driver. Simply viewing the site from the perspective of the left hand picture, it is hard at first to imagine why someone would proceed over this. But the photograph on the right (which is closer to the driver's perspective) shows how the driver, sitting nearly level, can see a road ahead of him that is level from side to side. From this perspective it seems reasonable to continue driving.

The driver's actions were consistent with mission, goals, and training. Note, also, that this road was typical of roads on which the vehicle had been operated in the past; in fact, the water tender had been driven on this very road before. The problem arose on the day of the accident

⁵ <http://www.myfirevideos.net/Default.aspx?VideoID=476>

because spring rains had softened the soil and caused erosion, just enough for the water tender to slip and tip over—another condition the driver would not have known.

Capt. Atkinson described a shift in his view of events:

One question that Chief Lannon asked [me] when we were up on the hill was, “Would I have driven across there?” And at first—my pride, and being a driver, and being a captain—I said “No.” But deep down, I didn’t feel that way. Based on what I saw—after you go back and look at the potential—I mean, I easily could have made that decision. And that was eye opening for me.

The investigators may have started with an expectation that this accident was the result of a clear, definable *cause*, such as a mechanical failure or a single blameworthy action. Yet the open nature of their analysis, their questioning attitude, allowed them to look beyond their expectations and understand the accident as a network of variables that reached far beyond any single individual or component. Human factors, loose soil, cultural and organizational factors, and equipment limitations came together to form a situation in which an accident occurred.

Investigators could not find a single action or individual to blame for causing the accident, yet they did develop several ways to improve the system and reduce the likelihood of a recurrence.

[Click here to watch the investigators discuss root cause, operator error, and taking the operator’s perspective.](#)⁶

⁶ <http://www.myfirevideos.net/Default.aspx?VideoID=427>

“I think what they've done with this investigation made the department safer, because it allowed people to open up and actually talk about it and discuss it—as opposed to being like ‘Holy crap, don't talk about it.’ I think in the long run, we'll be better off this way, because it was more open. It was: ‘Things happen, let's talk about it. Let's get it all out on the table. What can we change? What can be done?’”

**Chuck Kinne, Engineer
Chino Valley Fire District**

III. How the *Learn, Share, Be Fair* Approach Affected the Chino Valley Fire District

A. Benefits of the *Learn, Share, Be Fair* Approach

The Water Tender 66 Rollover Serious Accident Investigation Team:

- Were confident that their investigation process built trust between management and firefighters on the floor.
- Believed the investigation process yielded valuable lessons for improving safety.
- Believed that this process helped contribute to a culture of frankness and openness regarding mishaps and safety concerns, which will benefit future learning and improvement and advance a safety culture.

[Click here to watch Ch. Summers and the investigators talk about the benefits of their approach to the investigation.](#)⁷

[Click here to watch Ch. Summers and the investigators talk about the costs of *not* using this kind of approach.](#)⁸

Who shared this perspective? The same themes came across clearly in discussions with floor personnel, leadership and the union representative. From many perspectives within the department, this investigation process was seen as beneficial to enhancing communication and building trust in the organization.

⁷ <http://www.myfirevideos.net/Default.aspx?VideoID=428>

⁸ <http://www.myfirevideos.net/Default.aspx?VideoID=429>



B. Relative Costs vs. Benefits of Three Alternative Approaches

The investigation team talked about alternative approaches the department could have used: They could have “swept the accident under the rug,” or they could have “gone on a witch hunt.” They had seen examples of both of these approaches in fire service tradition, and they felt they were doing something new for the department with their *Learn, Share, Be Fair* approach.

Despite the benefits of their approach, it was more costly in some ways than using either of the other two common accident investigation approaches. What follows is a compilation of the relative costs and benefits of these three approaches, as perceived by agency leaders and investigators:



Jeremy Ault, Captain
Chino Valley Fire District

“The worst thing that could have happened was that we would have all blamed Mike; it would have affected his future career. But even more, we would have run right back out and either repaired the water tender we had, or bought one just like it because it was so awesome.

If we hadn't asked all the questions, if we hadn't looked objectively at the whole situation, we'd be right back—right now—where we were before, with the same cultural acceptance of risk, the same vehicle—or a vehicle of equal capability for danger—and we really wouldn't have moved forward at all.

We wouldn't have any kind of forward progression. We wouldn't have had any kind of shift in understanding. We wouldn't have gained any perspective or any forward momentum toward safety.

We'd be right back where we were.”

Learn, Share, Be Fair Style of Accident Investigation (As Used in the WT-66 Rollover Accident Investigation)

Benefits

- The investigation was seen as legitimate at many levels in the department.
- Enhanced trust.
- People will be more willing to communicate openly in future investigations.
- Found meaningful ways to improve policy and training, as well as engineering specifications for the replacement water tender.
- Culture of the organization is more conscious of risk because the event was discussed openly within the entire department.
- Because the investigation was shared with the fire service, other departments had the opportunity to learn from Chino Valley's accident.
- Kept a good employee involved with the department without unnecessarily alienating him.

Costs

- More time.
- More money.
- More effort.
- Less comfortable (because investigators focused on improvements needed at all levels of the organization)
- Less familiar process (this was new territory for them)

“Sweep it Under the Rug” Style of Accident Investigation

An alternative way to handle the accident would have been to “sweep it under the rug” or “keep it in the family.”

Why this approach would have made sense:

The accident damaged the vehicle, with only minor injuries to employees. The rollover did not damage private property or cause serious injury. There was no obvious wrongdoing.

Benefits

- Quicker.
- Simpler.
- Would avoid sharing information that could be embarrassing to the department.
- Less costly in terms of resources (time and energy, etc.).
- Less likely to “upset the applecart” by avoiding discussion of organizational and leadership factors.

Costs

- Not learning.
- Not improving.
- Not reducing the likelihood of a similar accident.

“Find the Culprit” Style of Accident Investigation

The Chino Valley Fire District could also have taken the “name, shame, blame, punish” approach: Find the people closest to the accident when it happened, blame them for causing it, and punish them.

Why this approach would have made sense:

Some members of the organization expected that the driver would be chastised or punished. This is a common reaction when a vehicle is damaged or someone is hurt: days of suspension or some other disciplinary action proportional to the severity of the damage, designed to discourage others from making the same mistake. It would have been consistent with past practice.

Benefits

The benefits of this approach are the same as in the “Sweep it Under the Rug” Approach.

Costs

The costs are the same as in the “Sweep it Under the Rug” Approach, with some additional costs:

- Management would lose credibility and trustworthiness in the eyes of floor personnel.
- District employees would be less likely to communicate openly in future investigations.

- The investigation would not carry the same legitimacy in the eyes of department personnel. It would have been perceived as an unjust approach and would have triggered a dispute if the union had chosen to defend its member against what it saw as an unfair punishment.
- Alienate a good employee who would be less likely in the future to give the same level of service to the department.
- Harm an employee's professional future, without any gain for anyone.

[Click here to watch Ch. Shackelford & Ch. Summers' recap the costs of their Learn Share, Be Fair approach, and whether the benefits were worth it.](#)⁹



⁹ <http://www.myfirevideos.net/Default.aspx?VideoID=430>

C. What About Accountability?

It is commonly accepted, that a sense of accountability and individual responsibility are key ingredients to effective and safe operations. Yet this investigation did not blame the operator (or any other individual) for the adverse outcome, so where does accountability fit into the process?

- Chino Valley Fire District Deputy Fire Chief Kirk Summers' response to this question: *"If we had found that Mike had done something wrong, we'd have taken appropriate action. But that's not what the facts showed."*
- Chino Valley Fire District officials were not against punishment in principle; they just did not see how it would have been useful in *this* situation. They pointed out that the purpose of disciplinary action is to change behavior. Considering how seriously Mike already viewed the accident, they didn't see anything more that they could have done to change his behavior, or that a behavioral change was even needed.
- District officials thought that, in this case, the responsibility for the accident was shared by the organizational culture, system, and leadership. They said there *was* accountability in the accident investigation report, but it is focused on the organization as a whole.
- Captain Ault questioned the assumption that accountability and punishment were the same thing. He suggested that the underlying question should be how to define "accountability." For him, there was not only organizational accountability within the investigation, there was also individual accountability: Mike was accountable in the sense that he was involved in the effort to understand what really went wrong and to help produce solutions.

D. What About Personal Responsibility?

Accountability and responsibility can be difficult to distinguish, yet this distinction may be fundamental to just and effective reaction on the part of leadership. In the fire service, one often-voiced concern over non-punitive investigations is that this approach may undermine operators' sense of personal ownership for their performance. The question to be addressed is, 'Did the Water Tender 66 operator somehow lose a sense of individual responsibility because he was not formally punished after the mishap?'

During the interviews and accident site visit with the operator of WT-66 for this case study, he brought up the concept of individual responsibility several times.

His reaction indicates that a sense of personal responsibility was prominent in his mind, even though he received no official blame or disciplinary action for the accident. He said he believes the driver is entirely responsible for the vehicle he's operating. So it appears that not being officially blamed after this accident did not remove his sense of personal responsibility for operating vehicles safely in the future.

The same theme arose in interviews with Engineer Chuck Kinne, who was one of the regularly assigned drivers of WT-66: Kinne said he considers himself entirely responsible for the vehicle he operates. Moreover, he thought that sometimes people should be punished after an accident, yet punishment would not have fit *this* particular accident.

Kinne said that, in this case, there was a cultural responsibility for the accident, "because we had a shared overconfidence, and Mike was driving the apparatus the way most of us would." He also thought that at the organizational level, there were issues of training, guidelines, and rules that could be improved to prevent similar accidents in the future.

Various Chino Valley Fire District firefighters expressed a strong sense of personal responsibility, even after this blame-free investigation. They didn't see themselves as mere products or victims of the system. Nor did they believe that *all* disciplinary action is unjust or that *all* accidents stem from systemic problems. Even the Union president, Pete Roebuck, said that sometimes blame belongs on individual operators.

This case study cannot address the big question of whether, in the long run, system-oriented accident investigations erode individual responsibility. But in this case, both notions—personal responsibility and organizational responsibility for failure—seem to coexist in operators' minds.

If we believe that individual responsibility matters, then all this suggests a bigger question: Where does personal responsibility come from? It seems intuitive that blame must somehow play a role, but *what other factors within an organization influence individuals' sense of personal responsibility and ownership for their performance?*



Tim Shackelford, Battalion Chief
Chino Valley Fire District

“Once we started this accident investigation process and everyone understood what our intent was, people really began to open up. I think nearly everybody we interviewed gave us the honest truth of what happened that day—what was in their mind.

And that was what we were trying to find out: Not just what people did—that’s easy to determine—but we wanted to explore the mindset of what was going on behind those decisions.

And I think that in most circumstances we were able to capture that.

I think people realized—and maybe not initially, but I think that they came around to the conclusion—that we were trying to do the right thing. We weren’t on a mission to damage somebody’s reputation, or to focus blame solely on one person. We were trying to find out what really happened and to prevent it from happening again.”

[Click here to watch the team talk about why they investigated the accident this way.](#)¹⁰

IV. Conditions that Shaped the Investigation Process

The accident investigators said this was the first time they had carried out an investigation like this. They said it was a new approach for them, and department personnel described it several times as a “paradigm shift.”

How did this shift come about? There did not seem to be any single point at which anyone decided to have a paradigm shift. Nor did the process seem to be driven by academic theory, strategy, or philosophy. Nor was it the result of a deliberate shift in formal policy or a pre-defined blueprint.

Capt. Atkinson joked about how the investigators’ understanding of the accident evolved over time: “It wasn’t like we stood there that day, when we were looking at the water tender [and we said], ‘Oh, it’s our culture!’ Those things came out afterwards.”

They did not set out initially to look for organizational or cultural factors, nor did they consciously attempt to apply Just Culture principles or produce a New View investigation. Although Cal Fire’s Ch. Lannon offered a template for the final report and initial guidance, the investigation team were not following a guide or manual.

What was viewed in hindsight as a “paradigm shift” seems to have been an accumulation of many small actions and decisions throughout the unfolding investigation. Note that investigators viewed these actions as merely “common sense” and “doing the right thing.” How did they get there?

¹⁰ <http://www.myfirevideos.net/Default.aspx?VideoID=431>

A. Trust and Intent

What stands out as the most important factor in shaping this investigation is the leaders' and investigators' clear intent: they were committed to “learn,” “share,” and “be fair.” More than anything else, these very clearly stated goals drove and shaped the investigation and the many small decisions and judgments along the way.

This is a critical point worth repeating: The key ingredient to the success of this process was commitment to a clear set of shared values.

Trust, Intent, and the Chain of Command

Several times, investigators pointed to leadership decisions by the department's Deputy Chief, Kirk Summers. They talked about how he defined the purpose of the investigation from the beginning and drove the intent to learn, share and be fair, and how team members internalized these values.

Moreover, as the investigation progressed and new facets of the incident unfolded, Ch. Summers supported the investigators' judgment and provided resources and a degree of autonomy as they carried out the shared intent. This allowed them to develop new insights and ways of understanding of the accident, which the team may not have expected at the beginning of the process.

It became apparent that there was also a less obvious way that Chief Summers supported the intent of the investigation: He insulated the mission.

Deputy Chief Summers mentioned that there were some camps in the organization who thought the Water Tender 66 operator should be chastised or disciplined in some way, as consistent with “past practice.” Yet Battalion Chief Shackelford said that he didn't feel any such pressure or expectation to assign blame. This suggests that Ch. Summers not only defined the intent of the investigation from the beginning and supported it as it progressed, but he also blocked out competing priorities that would have detracted from the *Learn, Share, Be Fair* purpose of the investigation. He provided a layer of insulation that allowed the investigators to focus on their mission without having to navigate through competing values.

Similarly, Deputy Chief Summers said that his Fire Chief, Paul Benson—at the top of the chain of command—supported the mission of this investigation and the judgment of Ch. Summers and the investigators: “Chief Benson was willing to let us do with it what we thought was right. He didn't try to sway it in any way or influence it in any way. He let it go the way it was going to go.”

The clear intent to learn, share and be fair, and the way this intent was supported through the chain of command (through support, autonomy, and insulation), allowed new insights to emerge and allowed investigators' understanding of the accident to evolve into a complex view that took systemic and cultural factors into account.

Initially, the accident investigators and department leaders did not know what the investigation would reveal (Was an individual to blame? Had there been some simple mechanical failure (for instance, “the axle snapped”)? Would the findings be embarrassing to the department?). Even with these uncertainties and potential embarrassments, Ch. Summers said, “We were very committed, real early on, to being very frank about what we found, and sharing whatever we

found.” It seems doubtful that this kind of commitment would have been possible without the confidence that the chain of command supported the investigators’ mission and judgment.

Field Reaction to the Investigation

Battalion Chief Tim Shackelford mentioned that, early on, there was hesitation by some participants to describe their experiences in detail. This initial reluctance changed, however. District employees became comfortable describing not only what happened, but also what they were thinking at the time. Chief Shackelford attributes this shift to the interviewees trust in the intent of the investigation: “People realized we weren’t on a mission to damage somebody’s reputation, or to focus blame solely on one person. We were trying to find out what really happened and to prevent it from happening again.”

The accident investigators also cited the union’s cooperation with the investigation as pivotal in gaining open involvement from floor personnel. And again, union cooperation seemed to hinge on trusting the investigators’ intent.

[Click here to watch more from Ch. Shackelford on building trust with interviewees during the investigation.](#)¹¹

Why did you trust this investigation process?

It really came from some candid conversations with Battalion Chief Shackelford. He said, ‘We’re not looking to create blame, we’re just trying to find out what happened.’ And I believed what he said. That kind of put everybody’s mind at ease.

Now, in hindsight, did Battalion Chief Shackelford do what you trusted him to do?

Absolutely.



Pete Roebuck
President Local 3522 Firefighter’s Union

Throughout interviews for this case study, the theme of trust arose again and again. This theme is central to making sense of the Chino Valley investigation, the results it produced, and the interactions among its players. Tightly linked to the theme of trust is the theme of intent. These themes were pervasive through discussions of:

- Relationships up and down the chain of command (eg. Fire Chief Benson’s allowing Deputy Fire Chief Summers to direct the investigation as he saw fit, and Deputy Chief Summers’ giving support and a degree of autonomy to investigation leader Battalion Chief Shackelford)
- The open cooperation of floor personnel and the union, because they trusted the investigators’ intent

¹¹ <http://www.myfirevideos.net/Default.aspx?VideoID=432>

- The mindset of leaders and investigators toward the apparatus operator: they did not pin blame on the operator—or any other individual involved in the accident—because they trusted that these personnel had the right intent while performing their duties on the day of the accident (eg. “Mike didn’t intend to do that.”)



Scott Atkinson, Captain
Chino Valley Fire District

“This type of investigation for our department is new. We [the training division] are a relatively new division. Having a battalion chief and two training captains is new. We used to have one training officer. It was a captain and he would have never done this type of investigation. In the past, just one battalion chief or a division chief would have investigated this. That would have been it.

I think that the diversity of us in our positions within the department allowed us to look at the entire scope of this accident from different angles. We brought all that to the table when we were helping put this report together.

I think by allowing us all to be involved, it gives you a much wider perspective and maybe even a more comfortable feeling with some of the players that we interviewed and came to some of the conclusions with.”

B. Multiple Perspectives Were Engaged in the Process

Chino Valley Fire’s training division—comprising Ch. Shackelford, Capt. Jeremy Ault, and Capt. Scott Atkinson—formed the core investigation team. These three had been promoted up through the department and were ingrained in its culture. They were involved in training and certifying firefighters to drive WT-66, and they had all spent many, many hours driving the vehicle in preparation for their own certifications earlier in their careers. They knew all the personnel involved in the accident, and had first-hand understanding of the operational realities surrounding the apparatus. Capt. Ault, for example, recounted what it was like practicing for his certification on WT-66: he described the peculiarities of the gear shift, the unusual weight and stopping distance, and visibility issues with the vehicle. He remembered memorizing just which gear shifts to make at which point on which hills, and how to maneuver around each S-turn.

The investigation team took direction from the Department’s Deputy Chief, Kirk Summers. He was relatively new to the department, having joined nine months prior to the WT-66 Rollover, after retiring from a neighboring fire department. Investigators said he “brought a fresh set of eyes.” Being a newcomer, he did not have the same “blindness” as personnel who had worked within the organization longer. Here is how Capt. Atkinson described this:

Chief Summers, coming from different department...really showed us that we did have a culture here that we were all ingrained in. We bought into [the culture], and I certainly bought into it.

I certainly didn’t look at [culture] initially. It really didn’t even come to my mind, until Chief Summers brought that up. He was able to look at it. He was relatively new at the time, less than a year. He was able to see that right off the bat and make that comment to us.

Then we started really thinking about it: “Okay, there is lot more to this than a guy just driving the water tender, and he made a poor choice, and rolled it over.”

The investigators also talked about the contribution of Ch. Doug Lannon, from Cal Fire’s San Bernardino Unit. An experienced investigator with the state fire agency, he joined the team for the first days of the investigation. His role was to advise the investigation team, help them

conduct initial interviews, build a chronology of events, and give a template for the investigation report. He helped them build an initial framework and gave them confidence in carrying out their investigation process. The investigation team talked about how he prompted them to evaluate some of their cultural assumptions and possible blind spots, and how it benefitted the process to include an outsider who did not know any of the personnel involved in the accident and could offer a measure of objectivity.

Just as the investigators recognized how they benefitted from Ch. Lannon's investigation expertise, they also noted the value of their own "inexperience...in performing investigations of this magnitude." They speculated that this helped them keep an open mind in trying to make sense of the accident. Note the interaction between expert and inexperienced perspectives:

We didn't have a preconceived notion of what it needed to look like. Doug Lannon came in and gave us template with his experience from doing investigations. But he never once said, "You guys have to find these things." He said, "Just look at it. Talk to people. Find out what happened." That was our advice, "Find out what happened."

A Brief Thought on "Deference to Expertise"

The High Reliability movement has championed the value of "Deference to Expertise" as one of the virtues characterizing effective processes. This virtue is commonly contrasted with overreliance on hierarchical authority.

The virtue of "Deference to Expertise" *can* be seen in the Chino Valley's investigation process, but characterizing their process in this way would be an oversimplification. Their process was shaped by the *balance* and *interaction* among authority, expertise, and inexperience (or "fresh eyes").

Chief Lannon brought expertise in accident investigation; his lack of personal familiarity with the individuals involved in the accident, and his status as department outsider was valued—just as Ch. Summers' status as a department newcomer was valued—for bringing objectivity and fresh eyes to the culture and organization. Chief Summers exercised authority and leadership to drive the *Learn, Share, Be Fair* mission of the investigation. Yet, in exercising his authority, he made room for the investigators' autonomy. The core investigation team were "ingrained" insiders to the department's culture and operations: their relationships with the people and equipment involved played a critical role in the investigation. But so did their admitted "inexperience" with accident investigations, which allowed them to keep an open mind in building their understanding of the accident.

C. A Pattern of Organizational Learning at Chino Valley Fire District

Review of the history of the District showed that this investigation was not an isolated event: it fit a pattern of organizational learning within Chino Valley Fire District.

The Swift Water Rescue Post Incident Review (PIR)

At 00:59, on Jan. 5, 2008—approximately four months prior to the Water Tender 66 rollover—the department responded to an incident involving two victims stranded in the Cucamonga Wash in the City of Chino.

The district's response was considered a success. The victim was rescued; no one was injured in the process; the incident received positive press coverage, and two firefighters received medals of valor for their actions.

Yet, in light of the high accident potential of that night's operations, Deputy Chief Kirk Summers (who had joined the district four months' prior to this Swift Water Rescue) made the decision to initiate a formal review process of this incident. He tasked Battalion Chief Tim Shackelford with the project.

The resulting *Swift Water Rescue Post Incident Review (PIR)* recognized the "courage, heroism, leadership, and innovation" of department personnel, but the report also pointed out "the rescue may have been accomplished sooner and certainly more safely." In particular, the review focused on improvements to equipment, training, and command decision-making.

Shifting Toward a More Formal Process For Lessons Learned

The Swift Water Rescue PIR marked a shift in the Chino Valley Fire District's approach to learning. Prior to the Swift Water Rescue, events were only discussed informally. Personnel were learning from incidents, but the learning was largely limited to people who were directly involved in an incident, or who spoke with them informally, localizing rather than globalizing the learning opportunities.

With this PIR, the department shifted towards a more formal process for capturing lessons learned, distributing them within the department, and making system improvements.

Setting the Stage

Chino Valley Fire District personnel pointed out that this swift water rescue and the water tender rollover mishaps were similar events. Both incidents—if luck or conditions had been slightly different—could have had very different outcomes.

The Water Tender 66 investigators thought that the Swift Water Rescue PIR helped set a tone of learning from the past and improving for the future, and looking at organizational and command factors, as well as individual factors.

The investigators also believed that the *Swift Water Rescue PIR* helped create a level of trust and credibility with department personnel who would later be asked to cooperate with the WT-66 Rollover investigation.

After the WT-66 Rollover Investigation—The Prison Riot Post Incident Review

During the interviews for this case study, Chino Valley Fire District officials were preparing yet another Post Incident Review, this time on a prison riot mass casualty and fire incident that the

district responded to August 8-9, 2009 at the nearby Chino California Men's Prison. As with the Swift Water Rescue, Ch. Summers' view of the incident was,

“Pretty much universally, the thing went really, really well. Very proud of how it went. But there are some things to learn. There are some *great* things to learn. We didn't hurt anybody at the prison riot. We had a real successful outcome. It would be real easy to say 'That was great, Let's move on.' No, no, no, no. Let's *go back*. Let's certainly be proud of our victories. But what could we learn from it? I think you're remiss if you don't take that opportunity.”

The investigators described their WT-66 Rollover Investigation as new territory for them. But sandwiched between the Swift Water PIR in early 2008, and the Prison Riot PIR in 2009, the WT-66 Rollover Investigation in mid-2008 appears as part of a larger a shift in values and beliefs surrounding incidents, moving decidedly toward organizational learning within the department.

D. The Role of Stories

Stories and Culture Influenced the Accident Itself

The accident investigators believed that stories and culture affected the operation of WT-66. This water tender was unique in the area: the off-road vehicle had a 4000 gallon tank and was exceptionally tall, even for fire apparatus. It was a ten-speed, square-cog transmission, six-wheel drive. It had a bumper-mounted turret and a deck gun—both remote-controlled from inside the cab. In its 15 years with the department (longer than any members of the investigation team had been with the organization), a reputation and mystique had grown up around “the Beast”: “Even learning to drive it was an accomplishment,” a “badge of honor.” “We would show up with 4000 gallons of water and—from remote control inside the cab—either put the fire out, or make mop-up non-existent.” “We had taken it in precarious positions and had been successful with it;” the myth was “it would run itself up a brick wall if you let it; it had that much power and gearing to do that. It will go anywhere, anytime.” This mythic perception was reinforced by larger-than-life stories passed around fire station dinner tables about “the Beast” and its impressive successes.

The investigators believed that these stories created a cultural acceptance of risk, based on an inflated understanding of the vehicle’s capabilities. This set the stage for how the water tender was routinely operated. In viewing the April 17, 2008 rollover accident through this lens, the investigators saw vehicle operations as normal within department culture.

Stories and Culture Influenced the Investigation Process

Just as the investigators considered the stories that influenced actors in the WT-66 Rollover, it is useful to consider the stories that shaped the investigators’ mindset toward the accident.

Deputy Fire Chief Kirk Summers was asked why he drove the investigation along its *Learn, Share, Be Fair* trajectory. He answered by citing stories of disasters, accidents, and investigations in other organizations:

“I think in my career I have seen it done a couple of ways. I’ve seen the Phoenix model. Where the history of the Phoenix Fire Department is when they have something really bad happen, they put together a very detailed report and send it out to the entire fire service, so that everybody has the opportunity to learn from their mistakes.

I have seen other organizations who are less than frank about what really happened, if you ever see a report at all. So there is a tremendous learning opportunity that got lost.

...

I always thought that if I ever had the opportunity to make that decision, I would fall on the Phoenix side. So to me it was a real easy decision to make. And we started out—the four of us [ie. Ch. Summers, Ch. Shackelford, Capt. Atkinson, Capt. Ault]—with that in mind. And that was the direction we took.”

In addition to Ch. Alan Brunacini’s (Phoenix Fire Department) handling of a Line of Duty Death in the 1980’s, Ch. Summers also reflected on the investigation of the Exxon Valdez and other maritime accidents. He and the investigators talked about other incidents they’d learned about through the annual California Interagency Wildland Fire Safety Officer’s Conference, Cal Fire “Green Sheets” (made available within the first 72 hours after an accident), and the “Secret List.”¹² These stores of perceived successes and failures in other organizations’ investigations influenced the Rollover investigators’ perspectives and decision-making.

¹² See footnote, p. 9.

In the Water Tender 66 Rollover investigation, investigators viewed their actions as simply “doing the right thing,” and “using common sense.” But the stories of disasters, accidents, and accident investigations in other organizations provided the background on which leaders and investigators at Chino Valley Fire formed their judgments. These stories shaped how the investigators saw the accident, and which actions would seem to them like “common sense” and “the right thing to do.”

Conspicuously absent from these discussions were references to books, movements, or theories. They explicitly (and without hesitation) denied that any of those played a direct role in their decision-making. This is noteworthy because the process that emerged in this organization bears striking parallels to current recommendations in the literature on safety, investigation, and learning culture (eg. Dekker, Reason, Weick and Sutcliffe, Hollnagel, Woods and Cook). Yet, even when directly asked, these decision-makers would not cite a *single* book or theory, just stories, stories, stories.

This observation is especially relevant for readers seeking to advance just culture, learning culture, and safety culture principles in their own organizations. Decision-makers at Chino Valley were trying to re-apply what had worked in other organizations, and to avoid what had not worked. They were not attempting to locally apply general principles or theories. It seems that in this case, cultural change was driven mostly by stories, rather than theories.

[Click here to watch the discussion about how outside stories affected this investigation.](#)¹³

¹³ <http://www.myfirevideos.net/Default.aspx?VideoID=433>

V. Conclusions and Open Questions

1-Under the circumstances of this accident in this department, this investigation approach worked. But under what circumstances would this style of investigation *not* be appropriate, feasible, or worth the costs?

2-It is commonly accepted within the fire service that personal responsibility and individual ownership for one's performance is a key element in safe and effective operations. It seems intuitive that blame somehow must play a role in this. In the current case study, we saw that the two don't always have to go together: Firefighters reported feeling entirely responsible for the vehicles they operate, yet didn't think the operator was to blame for *this* accident. If personal responsibility matters, and if blame is not the only factor in whether firefighters feel a sense of personal responsibility, then what *other* factors play a role in shaping individuals' sense of personal responsibility?

3- The time and resources invested in reviewing the Swift Water Rescue (a successful event with high accident potential) seemed to pay dividends for the department by contributing to a learning culture and setting the stage for the Water Tender 66 Rollover Investigation. This suggests:

- Leaders seeking to advance a culture of learning within their organization may find it useful to start by reviewing locally relevant success stories, stories of non-catastrophic accidents, and stories where there was no accident but there was high accident potential.

- Organizations already committed to a learning culture may be missing opportunities if they are not investing resources into analyzing and reviewing success stories, stories of non-catastrophic accidents, and stories where there was no accident but there was high accident potential. Because these events are less emotionally charged and less politically sensitive than catastrophic events, they may provide insights and opportunities for improvement that are harder to come by in the case of more severe accidents.

Appendix A - About the Author

Brad Mayhew served as a firefighter with the Los Padres Interagency Hotshot Crew.

Since 2005, he has offered classes on decision-making, risk management, and other Human Factors topics. He helped author the Human Factors pages in the Incident Response Pocket Guide (NWCG), and his work has appeared in the *Wildland Fire Safety Training Annual Refresher Video* (NWCG; 2006, 2010) and *FireRescue Magazine*.

In 2007, he received the NWCG Leadership Committee's "Paul Gleason Lead by Example Award" for Innovation.

Mayhew is currently finishing a Master's Degree in Human Factors and System Safety at Lund University.

Contact Information:

Bradley Mayhew
Fireline Factors Consulting
(800) 403-8007
3905 State St. #7-160
Santa Barbara, CA 93105
Brad@FirelineFactors.com
www.FirelineFactors.com



Brad Mayhew

Appendix B - List of Video Clips Appearing in this Report

Clip 9: <http://www.myfirevideos.net/Default.aspx?VideoID=425>

Union President Pete Roebuck gives his perspective on the investigation
(p. 2)

Clip 12: <http://www.myfirevideos.net/Default.aspx?VideoID=426>

Ch. Shackelford and Ch. Summers talk about the intent to Learn, Share, and Be Fair
(p. 8)

Clip 11: <http://www.myfirevideos.net/Default.aspx?VideoID=476>

A walkthrough of the accident site with operator Mike Rabehl.
(p. 10)

Clip 5: <http://www.myfirevideos.net/Default.aspx?VideoID=427>

The investigators talk about root cause, operator error, and taking the operator's perspective.
(p. 12)

Clip 3a: <http://www.myfirevideos.net/Default.aspx?VideoID=428>

Ch. Summers and the investigators discuss costs and benefits of their investigation.
(p. 13)

Clip 3b: <http://www.myfirevideos.net/Default.aspx?VideoID=429>

The investigators talk about the costs of taking a different approach.
(p. 13)

Clip 2: <http://www.myfirevideos.net/Default.aspx?VideoID=430>

Ch. Summers and Ch. Shackelford give their verdict on the Cost vs. Benefit analysis
(p. 17)

Clip 4: <http://www.myfirevideos.net/Default.aspx?VideoID=431>

Investigators discuss why they chose to investigate the accident this way
(p. 20)

Clip 8: <http://www.myfirevideos.net/Default.aspx?VideoID=432>

Ch. Shackelford discusses development of trust between investigators and department personnel
(p. 22)

Clip 7: <http://www.myfirevideos.net/Default.aspx?VideoID=433>

Discussion of how outside stories shaped this investigation, and the value of sharing stories
(p. 29)

Appendix C - Case Study Methods

For three days in October 2009, case study author Brad Mayhew interviewed seven Chino Valley Fire Protection District employees:

Kirk Summers

Deputy Fire Chief

Tim Shackelford

Battalion Chief (Serious Accident Investigation Team Administrator; Training and Safety)

Scott Atkinson

Captain, Training (Serious Accident Investigation Team Technical Specialist; Training and Safety)

Jeremy Ault

Captain, Training/EMS (Serious Accident Investigation Team Technical

Specialist; Training and Safety)

Pete Roebuck

Firefighter
(President of Local 3522 Firefighters' Union)

Mike Rabehl

Engineer (Driver of WT-66 during the rollover accident)

Chuck Kinne

Engineer (One of the regular drivers assigned to WT-66)

In addition to conducting these taped interviews, Mayhew also visited the accident site with WT-66 driver Mike Rabehl, read the department's Post Incident Reviews of other events, collected photographs, and reviewed investigators' notes from the Rollover investigation. Direct interviewer/interviewee quotes—as well as the corresponding video clips—in this report have been edited for brevity and clarity.

Appendix D - Chronology

Thursday April 17, 2008

- Rollover of Water Tender 66
- Arranged extrication of water tender and evacuation of homes below.
- Within hours of rollover, a Serious Accident Investigation Team was formed. Chino Valley Fire Battalion Chief Tim Shackelford assigned role of lead investigator. Team's first meeting is at the rollover accident site.
- Cal Fire San Bernardino Battalion Chief Doug Lannon joined the Serious Accident Investigation Team, helping with preliminary interviews and giving guidance to the team.

Friday April 18, 2008

- Battalion Chief Lannon helped create a template for the Accident Investigation Report.
- Within 24 hours of the accident, the department posted initial details on the "Secret List" Web site.¹⁴

Early May, 2008

- Three weeks after accident: The Serious Accident Investigation Team finished conducting interviews and gathering information.

Late May, 2008

- Six weeks after accident: The Serious Accident Investigation Team's Accident Investigation Report was released. (See Appendix A.)

October 29-30, 2009

- Brad Mayhew, who was developing a case study of the Water Tender 66 Rollover Investigation process, conducted interviews with Chino Valley Fire District personnel about this accident investigation and its effects within the department.

¹⁴ See footnote p. 9.

September 2010

- The Case Study of the Water Tender 66 Rollover Accident Investigation was released.

Appendix E - Some of the Changes Made by Chino Valley Independent Fire District in Response Their Accident Investigation

- Replaced the 4,000 gallon WT-66 by a 2,000 gallon unit with a much lower center of gravity. The tank on the new water tender is between the frame rails so it sits much lower.
- Improved the task books and certification processes for Engineers and Driving Firefighter positions.
- The new Water Tender is assigned in a “task-force” configuration: Both the WT and a Patrol unit will be staffed by a single, four person crew. This should help maintain a level of supervision while responding and on scene. This change will also maintain crew continuity.

Appendix F - Recommended Reading

Dekker, S. (2006). *The field guide to understanding human error*. Burlington: Ashgate Publishing Company.

Holden, R. J. (2009). People or systems? To blame is human. The fix is to engineer. *Professional Safety, December*, 34-41.

Reason, J. T. (1990). *Human error*. Cambridge: Cambridge University Press.

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Weick, K. E., & Sutcliffe, K. M. (2007). *Managing the unexpected; Resilient performance in an age of uncertainty* (2nd ed.). San Francisco: Jossey-Bass.