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Scholarship 2001.

Evaluation of systems to recognise and address safety issues promptly, effectively and universally and evaluation of systems which promote safe fire fighting behaviours and initiatives.

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Summary

This paper reports the findings of a study tour funded by the Emergency Services Foundation in 2001. The purpose of the study was to evaluate systems which recognise and address safety issues promptly, effectively and universally and to evaluate systems which promote safe fire fighting behaviours and initiatives. The evaluation was done in the context of applying the systems to aircraft operations at wildfires and with a view to developing systems for all firefighters.

9 safety systems are analysed in this report. 3 systems used by wildland fire management agencies in the United States of America are reported in particular detail. 3 Australian systems are analysed.

The United States Forest Service SAFECOM and AIRWARD systems are identified as being models of particular value for application in Australia. Successful adoption of these systems requires the injection of some management effort, not mere administration of a system.

The INDICATE Safety Program promoted by the Australian Transport Safety Bureau is recommended as a framework to apply the above systems.

Acknowledgments

The study reported here would not have occurred at all or at best would have been seriously compromised without the support of many people.

At home I thank Pauline, Andrew, Catherine and Alice for their tremendous support, not only during this project but for their support through a succession of fire interrupted summers, weekends and Christmas dinners.

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I thank the Emergency Services Foundation for firstly catalysing and secondly providing the financial means to complete this project.

Finally I extend a most heartfelt thank you to the 60 people I interviewed in the United States. These people all answered my most incisive, my most impertinent and my most ridiculous questions with clear, candid and polite replies.

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Purpose and Background

This report records observations and conclusions made on the use of various safety systems, particularly for Occupational Health and Safety (OH&S) Incident reporting, and particularly by organisations engaged in wildland firefighting. Several systems used in the United States and in Australia are examined.

One model of workplace accidents is the "Swiss cheese" model, (Maurino, Reason, Johnston and Lee, 1995). This model illustrates an accident as a trajectory penetrating successive layers of safety barriers represented as Swiss cheese. The barriers may be mechanical, procedural, or operator skill/experience/judgement. In turn the holes in the cheese represent partial failures in successive safety barriers.

Figure 1 "Swiss Cheese" Model
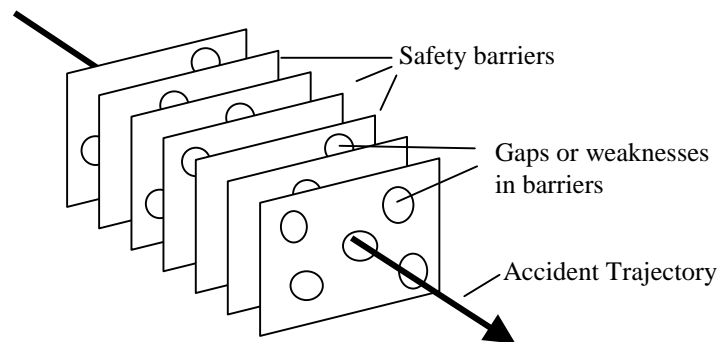
Historically only accidents involving injury or property damage have been the subject of investigation in the workplace. However there has been a progressive realisation that there are also lessons to be learned from events that do not result in either injury or damage. Accident and injury reports are now commonly termed Occupational Health and Safety Incident reports to encompass all events.

From Figure 1 above an OH&S incident causing injury would have an accident trajectory terminating at a person. An incident traditionally categorised by the term "near miss" would have a trajectory terminating to one side or short of any person (or property).

An accident trajectory penetrating some safety barriers but stopping at another is particularly worthy of analysis. We can identify and reinforce weaknesses in our defences and promote our strongest barriers by applying the knowledge gleaned from such an analysis.

The third group of OH&S incidents are those where a safety barrier failed but there was no accident trajectory. To use an example the driver noticed the leaking brake fluid which would have disabled the brakes before he started the engine. Some industries call such incidents "hazards", particularly if they are discovered by an inspection process independent of the "doing the job" process.

OH&S incidents involving injury or property damage are generally well reported and investigated in detail. Society and financial drivers both demand a reaction to these types of incidents and by their nature these incidents are plainly visible after the event

to both managers and regulators. By contrast OH&S incidents where the accident trajectory stops short of, or to one side, of a person are at best ephemeral and may only be visible to those directly involved.

An effective safety management system will provided for reporting of all 3 types of incidents:
  -Incidents resulting in death, injury or damage;
  -Incidents where some safety barriers were penetrated and some were effective;
  -Incidents (or hazards) where failure of a barrier was recognised in the absence of an accident trajectory.

Effective response to an OH&S incident requires not only reporting but also analysis and reaction to reports. An effective reporting system must be more than just a drop file in the Human Resources division or a data base behind the computer screen.

The study reported here examined some OH&S incident reporting systems available to wildland fire fighters in the United States of America and the techniques used to promulgate the lessons gained from reports made to such systems. The methods used by a small group of search and rescue specialists within the US National Parks Service are reported. 3 reporting systems used in Australia are also examined.

Apart from recognising and analysing failures of safety barriers organisations can recognise and promote practices which increase protection from an accident trajectory. Perhaps a hole is plugged or an entirely new barrier created. Where this occurs in one part of an organisation or a profession the practice or technique should be promoted across the organisation. This report also analyses an award system used by wildland fire fighting agencies in the USA to promote best OH&S practice in the field of aviation.

Risk management is fundamental to operations of any emergency service. The fact is that safety (of personnel) is not the over riding constraint on operations of an emergency service, it is merely a major constraint. If safety of personnel was important above all else then we would all stay home safe in bed.

A disciplined approach to risk management lets us get the job done while keeping operations within "acceptable" safety margins. Risk management principles underpin all reporting and safety management systems and were the subject of discussions through out the study tour. Conclusions drawn from these discussions are also recorded in this report.

Safety Systems Evaluated

3 safety systems used by wildland fire management agencies in the United States of America were analysed in detail. The 3 systems were:

SAFECOM, a confidential aviation incident reporting system used by Federal US land management agencies. (In fact two systems operate, both with the same name- one by the US Forest Service and the other by the Office of Aviation Services, part of the Department of the Interior which encompasses all US Federal land management agencies other than the Forest Service.)

SAFENET, a confidential incident reporting system available to all wildland fire fighters and shared by all US Federal agencies with responsibility for wildfire suppression on public lands.

AIRWARDS, an aviation safety award system for staff and contractors working for both the US Forest Service and the Department of Interior.

Web site addresses for these 3 systems are listed in Appendix 1.

Apart from the systems listed above a number of other safety systems were encountered in the course of my study in the United States.
These included:

The Green Sheet, a notification system used by the Californian Department of Forests, a State agency engaging both volunteer and paid firefighters and with responsibility for fire protection on freehold land and some public lands;

The *Associated Airtanker Pilots message board* (web address in Appendix 1); and finally,

Operations of a National Park Search and Rescue Unit were also examined.

I also examined the operations of the following Australian systems:

Confidential Accident and Incident Reporting System administered by the Australian Transport Safety Bureau;

Royal Flying Doctor Service, (Queensland Division)'s *SAFEDOC and RISKDOC systems*; and the

INDICATE Safety Program promoted by the Australian Transport Safety Bureau.

National Parks Service helicopter and rappel crew, Yosemite NP

Methodology:
Various techniques were used to evaluate the safety systems studied. Generally good quality procedural information, and in some cases live data, was available via the Internet. This was particularly the case for the 3 systems used in the USA. A list of useful web addresses is included in Appendix 1.

Over 2 weeks in the USA I interviewed more than 60 managers, administrators, employees and contractors using these systems. A list of persons interviewed is provided in Appendix 2. This process gave me a full understanding of the workings of the systems and an insight into the perceptions of a wide cross section of users of the systems.

Interviews were wide ranging and conducted in a manner to put the interviewee at ease. Generally I was introduced by a respected and trusted colleague of the person being interviewed. In most cases interviews were conducted in the absence of the interviewee's supervisor. On occasions more than one person was interviewed in groups of up to 3. To ensure that key areas were discussed with each interviewee I used a standard list of issues as a framework for all interviews (refer Appendix 3). Interviews were conducted to explore the thoughts, opinions and perceptions of the interviewee rather than to assemble a statistically valid data set.

Analysis of the Confidential Accident and Incident Reporting System was based on a very limited informal survey of users and to examination of reports and articles generated from the data base. The two persons interviewed below in relation to the SAFEDOC and RISKDOC systems had also been employed previously by the Civil Aviation Safety Authority as inspectors and they provided a regulator's perspective of the Confidential Accident and Incident Reporting System. Opinions sought in no way could be seen to encompass anywhere near the full gambit of views of those involved in a system available to the entire Australian civil aviation industry. Despite these limitations an understanding of the system provides a useful and vital context for emergency services evaluating reporting systems for aviation operations.

Analysis of the Royal Flying Doctor Service, Queensland Division's, SAFEDOC and RISKDOC systems is limited by the fact that interviews were only conducted with managers and administrators, not with users reporting on the system. The Chief Pilot of the Queensland Division of the RFDS was interviewed as was an "anonymous'' third party "Watchdog" whose job was to receive and analyse reports made both through the regular chain of command or made directly and confidentially to him.

Comprehensive details of the ATSB Indicate system are available by download from the ATSB web site. The report below draws primarily on this source but also on a brief review of various safety systems published by the Civil Aviation Safety Authority (CASA 1998). A software package (INDICATE SAFETY Program V 6.4) to administer the system is also evaluated.

Description and evaluation of systems:
SAFECOM:

The SAFECOM system has 2 manifestations within
Federal US land management agencies. One version is
used by the US Forest Service, the other by the Office
of Aviation Services which provides aviation services
to the US Department of the Interior.
Land management agencies such as the National Parks Service, the Bureau's of Land
Management and Indian Affairs, and the Fisheries and Wildlife Service are part of the
Department of Interior. (Each agency is responsible for wildfire suppression on its
own lands). The similarity of the Forest Service and Office of Aviation Services
systems is more than skin deep, the software to manage the computer data bases of
both systems were prepared by the same programmer.

The observations below deal specifically with the operation of the US Forest Service
version of SAFECOM however wherever there are major differences in the Office of
Aviation Services version these are been noted.

SAFECOM is the user interface of the Aviation Mishap Information System which is
an electronic data (files) storage based system encompassing all aspects of aviation
mishap reporting within the U.S. Forest Service. The working title of "SAFECOM"
arises from the title of the form used to both input and output data. A copy of the
SAFECOM reporting form and a complete report is included in Appendix 4.

The system is designed to:
> *"………… report any condition, observance, act, maintenance problem, or*
> *circumstance which has the potential to cause an aviation-related mishap.*
> *Submitting a SafeCom is not a substitute for "on-the-spot" correction(s) to a*
> *safety concern, rather it is a tool used in the documentation, tracking, and*
> *follow-up corrective action(s) related to safety issues."*

SAFECOM therefore encompasses both near misses and hazards.

Categories of reports include aircraft mishaps, aviation hazards, aircraft maintenance
deficiencies, airspace intrusions and procedural violations.

The SAFECOM data bases are easily interrogated enabling Forest Service personnel
as well as contractors to readily source details of incidents relevant to the type of
operations in which they are involved. Two levels of access are maintained, one for
all users, and one for Forest Service managers responsible for aviation safety. The
former level of access denies knowledge of who was specifically involved in an
incident, all other details are available. Both levels of access show the registration
numbers of aircraft involved. The Office of Aviation Services SAFECOM system
does not provide registration numbers to all users and clearly provides a higher level
of confidentiality. The fire fighting industry is relatively small all the same, and in
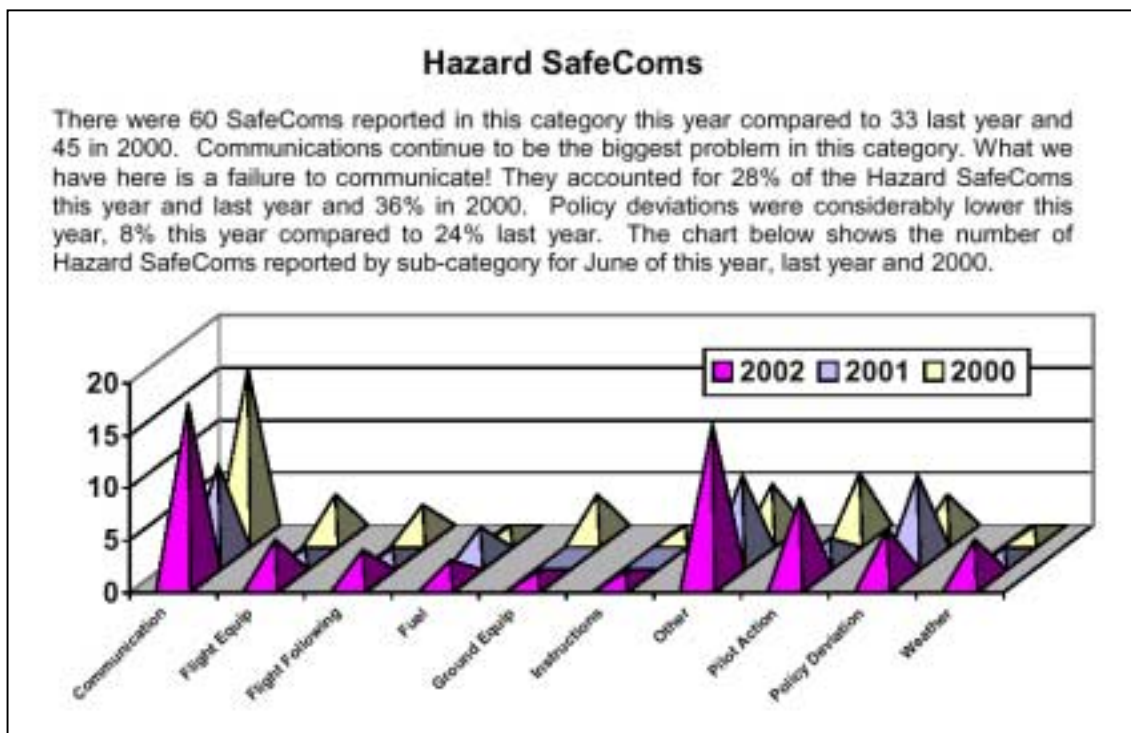such an industry the identities of individuals will be known, at least in the short term.

Corrective actions must be recorded for any incident reported. The system not only
provides for, but also requires, comment to be included in reports by both line

supervisors and a senior manager, (see complete SAFECOM in Appendix 4). This process ensures that corrective actions are evaluated against agency standards and gives an opportunity for senior management to endorse or modify corrective actions and to promulgate these decisions. The Office of Aviation Services is an intermediary between agency staff and the aviation industry whereas the Forest Service is responsible for both. Generally corrective actions reported in Office of Aviation Services SAFECOM's are less incisive than those of the Forest Service.

Reports are confidential but not anonymous maintaining accountability. Senior managers consistently emphasised that the system is not for punitive purposes and that contract management had to remain separate from the SAFECOM system or the system would founder.

The system is about ten years old, although the electronic data base is a more recent innovation, reporting rates are increasing and accident rates are decreasing. The SAFECOM system was highly regarded by all users including senior managers, agency aviation specialists, and contractors. While support for the system from senior staff was not a surprise the universal enthusiasm for, and application of, the system by all agency personnel was not expected. Finally, the contractors supported the system.

The system is used as a data base for recognising safety hazards or trends at senior level and so influences policy. Periodic and annual summaries are produced centrally and promulgated in hardcopy and via the Internet. In addition the reports pick up particular safety themes, record the results of any accident investigations, and publish the details of safety awards made. The chart and text below is an extract from the June 2002 aviation safety report of the US Forest Service illustrating the type of information presented.

Hazard SafeComs

There were 60 SafeComs reported in this category this year compared to 33 last year and 45 in 2000. Communications continue to be the biggest problem in this category. What we have here is a failure to communicate! They accounted for 28% of the Hazard SafeComs this year and last year and 36% in 2000. Policy deviations were considerably lower this year, 8% this year compared to 24% last year. The chart below shows the number of Hazard SafeComs reported by sub-category for June of this year, last year and 2000.

Production of the comprehensive periodic reports summarising activity demonstrates a major commitment by agencies to supporting the SAFECOM system. Even during the record work loads of the 2000 and now the 2002 fire seasons maintenance of the SAFECOM system and the production of quarterly reports has continued. Maintenance of the system alone requires considerable effort by the Regional Aviation Safety Managers who need to commit about 2 hours each day to the system to investigate reports and append corrective actions.

Airbase managers in the USA use the powerful filters available to interrogate the SAFECOM data base to provide reports relevant to the operations of their airbase. These managers include incidents reported on the system in their weekly safety briefings or in ad hoc briefings if required. They are entirely at ease in using the system as a tool to promulgate lessons learned. Note that the same filters and information are available to anybody with Internet access

Example of filters available to search SAFECOM reports

Companies and pilots use the data base. At first the attitude of pilots appeared at best ambivalent. *"Never been the subject of one (a SAFECOM) and never want to be!"* typified the initial response of most but after the bravado died down all pilots proudly admitted that they sought out reports posted about their type of aircraft or operations of the type they were engaged in. Although most pilots were Internet savvy and had access to computers at each airbase they generally relied on hardcopy reports generated by the airbase manager.

Several contractors found the system a useful tool to provide frank feedback to their employer, ie to the Forest Service. They felt less constrained reporting via SAFECOM than through the lines of commercial management.
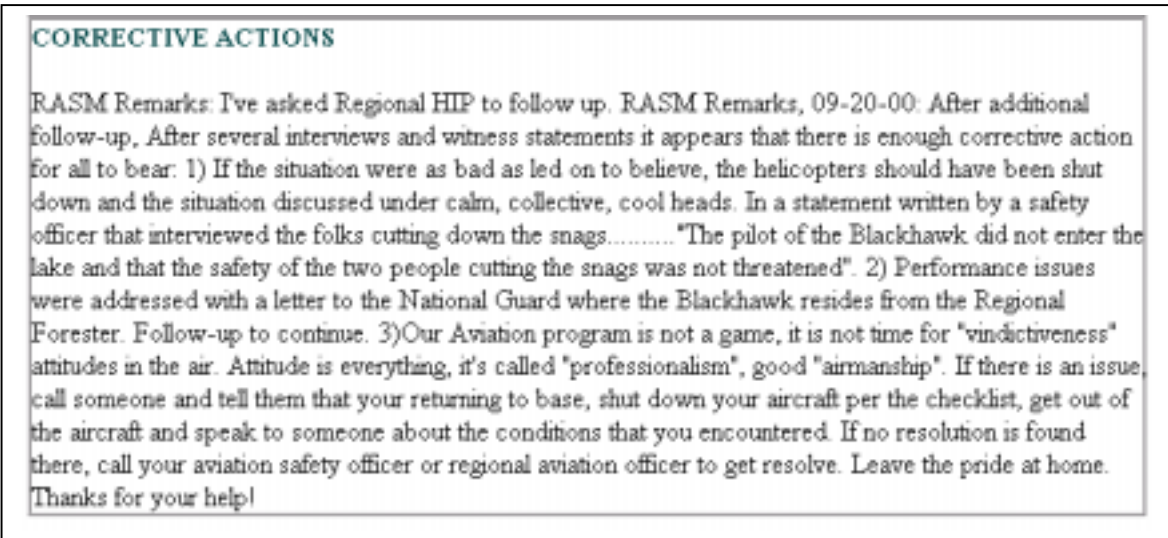
Several staff interviewed could cite examples of modifications to procedures or equipment arising from individual or clusters of SAFECOM reports.

The attitude of those staff or contractors who had been the subject of a SAFECOM varied with the time interval since the report was submitted. Where a report suggested a failure in a persons performance there was a high level of discomfort, and

even denial initially, but tapering off to a frank admission of a lesson learned as time passed. (The process of management review of SAFECOM's involves interview of all parties prior to posting of the SAFECOM).

Senior managers of the system were extremely conscious of the need to maintain confidentiality and of the need to maintain an environment where users could report without fear of punitive action. SAFECOM is not used as a tool to fix blame. Where the performance of an agency officer appears deficient the SAFECOM may precipitate a stand down, but not in the loss of accreditation. Accreditation is addressed through separate training and assessment processes, albeit processes that may have been catalysed by the SAFECOM. The system offers information, such as summaries of maintenance failures, which would be useful in contract management however the processes are kept separate and other measures of contractor performance are adopted.

Occasionally vexatious reports are submitted. These are generally dealt with in meetings with the persons involved prior to posting the report and so the report is modified. Occasionally a reporter does not wish to modify the report and the manager is prepared to post the report. On these reports the manager may well make the agencies position very clear when he comments within the corrective actions section. See comments provided by Regional Aviation Safety Manager on FS SAFECOM 00-890 below:

CORRECTIVE ACTIONS

RASM Remarks: I've asked Regional HIP to follow up. RASM Remarks, 09-20-00: After additional follow-up, After several interviews and witness statements it appears that there is enough corrective action for all to bear: 1) If the situation were as bad as led on to believe, the helicopters should have been shut down and the situation discussed under calm, collective, cool heads. In a statement written by a safety officer that interviewed the folks cutting down the snags.........."The pilot of the Blackhawk did not enter the lake and that the safety of the two people cutting the snags was not threatened". 2) Performance issues were addressed with a letter to the National Guard where the Blackhawk resides from the Regional Forester. Follow-up to continue. 3)Our Aviation program is not a game, it is not time for "vindictiveness" attitudes in the air. Attitude is everything, it's called "professionalism", good "airmanship". If there is an issue, call someone and tell them that your returning to base, shut down your aircraft per the checklist, get out of the aircraft and speak to someone about the conditions that you encountered. If no resolution is found there, call your aviation safety officer or regional aviation officer to get resolve. Leave the pride at home. Thanks for your help!

The SAFECOM database provides a source for nominations for the safety awards (AIRWARD's) discussed later.

The US Forest Service aircraft (own and contract) fly about 100000 hours each year, this generates up to 1000 SAFECOM's.

The success of the SAFECOM system lies in the separation of reporting and corrective action functions. *"Submitting a SafeCom is not a substitute for "on-the-spot" correction(s) to a safety concern"*. The problem is fixed first and reported secondly, subsequently the system provides for endorsement or modification of the corrective action.

SAFENET

SAFENET is a confidential, and if the reporter elects, an anonymous, incident reporting system available to all wildland fire fighters and shared by all US Federal agencies with responsibility for wildfire suppression on public lands.

SAFENET was created in response to a single incident resulting in the deaths of 14 firefighters in 1994. It is modelled on the SAFECOM system but SAFENET has a number of major differences:

-SAFENET was introduced after a limited one season trial, rather than evolving over more than a decade.

-SAFENET does not emphasis the importance of identifying a corrective action and is marketed as a means to "…correct unsafe situations in wildland fire". By contrast SAFECOM marketing emphasises that submission of a SAFECOM "….. is not a substitute for on the spot correction of a safety concern".

-SAFENET's are posted on the publicly accessible web site prior to review by line managers and potentially before the supervisor is aware of the issue.

-Half of the SAFENET's posted lack comment or endorsement by line management. Readers, and even those submitting reports do not know if the action taken was appropriate.

SAFENET was launched with much fanfare and is web based although reporting via the web is not mandatory. Interviews with fire fighters in the US gave an insight into the pitfalls of computer based systems. I interviewed a small group of supervisors aged 45-50 years. Under questioning they recalled something about the program, *"…..one of them fellas from Boise came out with one of them fancy computer projectors a couple of years ago didn't he? …Yeah. Hey go and grab young Jake he was talking about something like this the other day."* Jake being a seasonal fire fighter in his early 20's appeared with a couple of his peers, they reeled off the web address, the purpose of the system and what the latest postings were.

Despite Jake's awareness SAFENET had only been partially taken up by fire fighters when I visited the US and the system was ineffective.

Appendix 5 contains an example of a completed SAFENET. The subject of the report, an unsupervised retardant drop onto fire crews is a serious breach of safety procedures with potential to cause fatalities amongst those hit. The corrective action recorded does not go further than the suggestions made by the person initially making the report. This leaves the issue open and unresolved.

The same incident was reported via the SAFECOM system, (Appendix 6). By contrast the corrective action contains a comprehensive description of the circumstances of the incident and identifies several procedural failures. It goes on to identify further risks created by the same failures and identifies follow up actions to be undertaken to reduce the chance of a repetition.

AIRWARDS

AIRWARDS are awarded "in recognition of professional performance during a hazardous aviation event or significant contribution to aviation mishap prevention". The awards process encompasses both the US Forest Service and the agencies of the Department of the Interior (although the Forest Service and Department of Interior have separate SAFECOM systems).

The awards are minor in tangible benefits, a certificate and a T-shirt or cap but well publicised via a newsletter (Appendix 7), the web and included in the periodic reports of safety performance used to promulgate SAFECOM data.

Many of the awards arise from reports submitted via the SAFECOM systems, the two processes dovetail together very neatly.

Senior managers involved in selection of recipients did not use the awards to push particular safety issues but happily conceded the value of rewarding people for "saying no". By this mechanism the agencies endorse and support their own policies and procedures. The process of publicising the awards spreads this message beyond the local administrative unit, a strength of AIRWARD over other agency award systems which have a local focus.

All the people I interviewed were comfortable with the AIRWARD system, and the awards did not appear to engender either embarrassment or jealousy amongst recipients or peers respectively.

Helicopter Manager Strikes Again

When the relief pilot showed up in Wiggins, MS to relieve the pilot for the helicopter Kirby Cook from the Beaverhead-Deerlodge NF was managing, the first thing Kirby did was check his card. Immediately red lights were flashing, the pilot was not carded for the mission. The pilot told Kirby that he had been carded in June for aerial plastic sphere dispenser, but it wasn't on his card. Kirby spent the rest of the morning burning up the phone lines calling various regions, OAS and the company to verify the pilots qualifications. Kirby verified that the pilot was in fact qualified and by noon the helicopter was launched to the burn site to begin firing operations. Checking pilot and aircraft carding is essential to our safety program. This event demonstrates the importance of checking the paper work. Great job Kirby, this Airward's for you. USFS SafeCom 01-43

The actions rewarded above resulted in the loss of half a day of prescribed burning. when, with hind sight, operational safety standards were not going to be compromised. In the US, as in Australia, the window of opportunity for prescribed burning is far smaller than the burning program that needs to fit through it. The loss

of half a day "for nothing" could be seen as bad management not cause for celebration!

I followed this up with several senior managers and they were all emphatic that this was how their agencies operated and how they wanted their agencies to operate. I interviewed an offsider of the recipient of the award and that person was surprised at my suggestion that there may be dissent about the decision to suspend operations. He said that both he and the pilot supported the actions of the helicopter manager and that he would expect management to support the action.

We should all test our procedures and policies against the above circumstance. Do our procedures reflect how we want everything done or just how we would have wanted the job done if there was an accident?

(As a footnote a month later the same zeal in application of accreditation standards saved a Forest Service technician from a serious helicopter accident, Appendix 7)

CDF Green Sheet

The California Department of Forests uses a reporting format known as the green sheet to promulgate the results of incident investigations. An example is included in Appendix 6
.
The sheet is only used for incidents subject to an investigation. While it provides a strong statement of agency requirements for future actions and a strong message of the consequences of failure, it does not function as a data base, nor does it provide a process for reporting incidents in, it merely addresses reporting results outwards.

It is a long standing system and perhaps the quirky title of "green sheet" for something now printed on white paper helps circulation. A strength of the process lies in the reinforcement of training in the closing remarks of the report.

CDF Air Attack Supervisor and agency aircraft

Associated Airtanker Pilots message board
This message board is particularly well moderated and provides an effective mix of banter and sound advice. The web site also has a confidential incident reporting process however I have been unable to solicit any detail of its method of operation, nor of its effectiveness.

A problem with public sites is that data may be misused. In the United States media groups use the site as a source of information. The issues associated with an open site are recognised by the Airtanker pilots and recently were particularly well enunciated by one of association's members. I have quoted the particular posting in full below:

Posted ByJim Barnes on August 13, 2002 at 17:55:07:

In the aftermath of the tragic accidents that we have suffered this fire season we have seen a flurry of activity on the AAP Message board. I fear that some of the negative press directed at our industry and aerial firefighters has its origins from posts on this board. The shock and pain of terrible loss has moved many of us to post messages motivated by our emotions. I am no exception to this.

It is imperative that decisions made to plot the future course for the US Forest Service air program be arrived at by consideration of the facts and only the facts. Our message board is an open forum that allows any one to post any idea or opinion. Ideas and opinion are the beginnings of new developments but only facts obtained by tests and evaluation in the field can be considered as the basis for a decision.

Now we are faced with a problem. The news media now routinely reviews our board in search of a story line. It is almost impossible for them to tell fact from fiction on the message board. We have seen cases where unsubstantiated opinion is being used to substantiate a news story.

In order to stop outright censorship we are asking that persons posting messages on our board please identify themselves. If you are a firefighter or an aerial firefighter identify yourself as such. If you are an interested party or enthusiast with no fire line experience please do not represent yourself as an expert.

It would be a cruel irony if our organization whose goal it is to promote safety, education and the airtanker industry unwittingly contributed to its demise.

My appeal to the news media folks is this; you are always there to document our failures and the pain of grief caused by our fatalities and it is right that you do so. Please also try to remember the other 95% of the story. It is the greatest success story never told.

The impact of our past successes will become all too evident if the airtanker industry is allowed to die of its wounds.

Jim Barnes

This site is a powerful tool for both gauging industry views and for exchange of ideas. Flippant remarks are often turned into effective safety messages by more experienced

pilots. While an agency can not run such a board there is opportunity to nurture professional associations who may. Aviation managers within the US Forest Service certainly monitor the Associated Airtanker Pilots site.

Message boards such as the Associated Airtanker Pilots site can very rapidly disseminate information, however it is often not targeted. News of one of the fatal airtanker accidents in 2002 appeared to be shared in real time on this site, perhaps friends and relatives would have preferred to hear about it personally rather than finding details on an open web site.

Operations of a National Park Search and Rescue Unit

I interviewed National Parks rangers responsible for Search and Rescue at Yosemite National Park. This group are part of a larger group of about 30 rangers across the United States responsible for search and rescue. These rangers work in rescue operations with ad hoc teams which include volunteers. They are innovators and rely on an annual conference and peer contact to develop new techniques, standards and cultures.

Accidents involving rescuers are comprehensively analysed however there is no data base or system to address lesser incidents. Rangers do share thoughts and ideas via an Emergency Management and Search and Rescue electronic bulletin board.

As with many emergency organisations they face the dilemma of trading off emergency service worker safety for public safety. Search and rescue workers are particularly subject to these pressures as there is a direct correlation between their efforts and the well being of individual members of the public.

One ranger put forward the suggestion that 60 minutes of very high risk rescue activity with a helicopter and crew of 5 was preferable to 20 hours high risk rescue activity for 20 people using ropes. The ranger did not consider a protracted and safer rescue over several days at a greater risk to the person in distress, but with little risk to rescuers, to be an option.

Wildland firefighters are fortunate that the link between their actions and public welfare is not immediately apparent and that this gives them real options in any risk analysis.

<u>Royal Flying Doctor Service, (Qld Division)'s SAFEDOC and RISKDOC systems</u>

 I examined a safety management system of the RFDS (QLD Division). The system has 2 parts RISKDOC and SAFEDOC.

RISKDOC sets out methodologies to identify, assess and control risks. The risk management procedure borrows heavily from Army procedure adopted after the Blackhawk helicopter training accident. The RFDS (QLD) Chief Pilot emphasised that risk management policy must be clearly defined before rolling out a confidential reporting system. It is critical that accountability and reporting lines remain uncompromised in the reporting of particular incidents and hazards.

RISKDOC is stronger for mid and long term planning, but not well pitched at issues of immediacy, these fall back to the application of experience and the considered judgement of experienced people. The RFDS employs high hours, experienced pilots, people who are well equipped to make considered judgements based on experience.

SAFEDOC is a system for reporting accidents, incidents and hazards. Reports may be made to line managers or confidentially. (In this context the confidential system withholds the identity of reporters from management and supervisors, by reporting to a 3rd party outside of the organisation, called "Watchdog"). Risk policy requires many events to be submitted via line management anyway and copied to Watchdog so supervisors are kept in the loop. The confidential elements are something extra, not an alternative

Confidentiality may compromise resolution of some issues. Management (ie RFDS Chief Pilot) is prepared to forgo the short term gain of identifying individuals for the long term good of the system.

The system is being adopted by other RFDS divisions but one is using an internal watchdog. One division is not going to adopt, perhaps due to likelihood of industrial instability of that division compromising the reporting system.

The selection of the "Watchdog" is critical. Not only must he have the skills for the job he also needs the interpersonal skills to maintain respect of management employing him. Further it is inevitable that eventually the identity of any "Watchdog" will become known. "Watchdog" must be a person whose judgement is respected in the industry, he needs to be the type of person who the pilots would have selected themselves for the job.

The Chief Pilot of RFDS (Qld) and Watchdog share common safety values and their similar backgrounds lead them to common solutions hence the Chief Pilot is comfortable with Watchdog addressing safety issues. Watchdog is a safety leader in the civil aviation industry and has a considerable breadth of technical, flying and regulatory experience.

RFDS (Qld Division) system launched in Sept 2001. Since then 29 reports have been submitted, only 2 of these confidentially. Hazards are also identified by audits and by work unit meetings.

SAFEDOC is designed primarily for pilots. Medical staff are discouraged from reporting directly to Watchdog. I believe that this is major weakness of the system. Exclusion of medical staff narrows the safety perspective to one of self analysis. Nor does it foster a Crew Resource Management culture. Crew Resource Management is defined as "the effective use of all resources available to the flight crew, including equipment, technical/ procedural skills, and the contributions of flight crew and others" (Taggert, undated, Nick Ryan pers com). Crew Resource Management is a major plank of aviation safety programs.

Awards are part of the systems and part of military systems. They are effective according to RFDS experience. Watchdog also publishes a newsletter to highlight key issues and to maintain the profile of safety issues.

The RFDS has a number of features in common with the Department of Natural Resources and Environment and CFA's joint State Aircraft Unit:

Similiarities between RFDS (Qld) and State Aircraft Unit (SAU) operations

Flying hours of similar magnitude: RFDS 14-15000 hours, SAU 5000 but SAU hours all with outside contractors and half of these casual hire aircraft.

Working in a challenging and unregulated physical environment in remote areas under difficult conditions (RFDS- bush strips at night, poor weather conditions; SAU-bush strips, flying in turbulent and high density altitude conditions, low level operations, low visibility)

Pressure to deliver service (patient welfare RFDS, fire suppression SAU) for good of community may compromise operational safety

Interaction with people from outside the aviation industry (RFDS; doctors and nurses, passengers and patients, refuelers, airstrip managers: SAU; fire operations officers, agency trained aircrew and passengers, refuelers, reloaders)

Confidential Accident and Incident Reporting System

The operation of the Confidential Aiviation Incident
Reporting system is well documented elsewhere and the
summary below has been taken from the Australian
Transport Safety Bureau's web site.

The Confidential Aviation Incident Reporting (CAIR) program offers a method of reporting aviation incidents and safety deficiencies while preserving the confidentiality of the reporter.

The CAIR program is open to anyone who wishes to submit a report to the Australian Transport Safety Bureau in confidence.

CAIR does not replace the mandatory aircraft accident and incident reporting system, it is a supplement to it. The program's focus is not on individuals, but on systems, procedures and equipment.

CAIR was established in 1988 following a feasibility study that showed more than 50 per cent of all accidents and serious incidents reported from all sources involved flight crew performance. However, only 12 per cent of the incidents reported by flight crew involved flight crew performance.

The reasons for flight crew not reporting flight performance incidents were canvassed through interviews. Fear of punitive action was the most common reason given for not reporting. As a result the CAIR program was established with the objective of providing access to critical air safety information, which was previously unavailable.

The program is designed to capture information regardless of how minor it may appear that would otherwise go unreported and includes an element of 'whistle-blowing'.

The strength of CAIR is the ATSB's absolute regard for the preservation of the reporter's identity. CAIR does not accept anonymous reports or reports based on unverifiable information. The CAIR manager must have a way of contacting the reporter to clarify any ambiguity

A CAIR report is actioned according to its nature. If another organisation can rectify the concern raised in the report, all factors that could reveal the reporter's identity are removed and the report is forwarded to that organisation for action..

The ATSB supplement in the 'Flight Safety Australia' magazine is the primary method of publishing report and obtaining feedback on CAIR issues.

While the Confidential Aviation Incident Reporting system is available to those involved in aviation with emergency services the relatively small scale of operations limits the analysis of patterns and the focus of the system is restricted to regulation. In this regard the system certainly provides a means of addressing issues, particularly where an emergency agency may be pressuring , encouraging or permitting contractors to work beyond acceptable safety standards.

Thus far it appears that both aviation contractors to the Department of Natural Resources and Environment and the Department itself have not elected to use, or rarely use Confidential Aviation Incident Reporting to resolve safety issues.

INDICATE Safety Program

The systems analysed above, with the exception of the Royal Flying Doctor Service RISKDOC and SAFEDOC systems are only elements which make up a safety program. INDICATE is a full safety program encompassing a number of systems.

The program was developed by the Australian Transport Safety Bureau as a tool for small and medium size companies to use to prevent accidents. It is pitched at the aviation industry and was catalysed by the Seaview Air accident which resulted in 9 fatalities.

The program was trialed by Kendall Airlines and is used by several small operators in Australia. The RISKDOC and SAFEDOC systems above have many elements in common with the INDICATE program.

The program is based on the following elements (ATSB 2001):
- Safety must be recognised as a priority within the company
- Senior management must be committed to improving safety standards
- Appropriate resources must be allocated for safety management

Six activities are used to deliver the program:
- Appointing an Operational Safety Manager
- Proactively identifying aviation safety hazards by conducting a series of staff focus groups
- Establishing a confidential reporting system
- Establishing regular safety meetings with management
- Maintaining a safety information data base
- Ensuring that vital safety information is regularly communicated to staff

The INDICATE program has been successfully adopted by a number of Australian low capacity passenger carrying operators of varying sizes as well as some international airlines. It is suitable for smaller operators (CASA 1998).

The package of information about implementing INDICATE includes an MS Access program to record hazards and monitor corrective action. The program is suitable for operations from several different sites and provides useful reports and provides for various filters or sorts to be applied. It provides summaries of incomplete corrective action where required.

The strong aviation pitch of the system would need modification to increase relevance if applied to operations, even aviation operations, of an emergency management agency. This could be achieved by modification of the existing software or by redesign using the INDICATE flow charts and reports as a template.

Conclusions:

The systems analysed above all have potential to make the workplace of emergency workers safer but their effective application is dependent on the arrangement of the systems into a cohesive program, and on the program being fully supported by line management.

The motivation of the US Forest Service managers, employees and contractors to have safe air operations is what drives the success of SAFECOM and AIRWARD, not the computer software or the design of the reporting form.

It may be appropriate at this stage to reflect on the overall safety record of US wildland firefighting agencies. Certainly they employ more firefighters, have larger fires, frequently in tougher terrain. But they have a lot of accidents. 4 firefighters died the week before I visited last year in an accident that could have been avoided at a number of decision points. The US contracts fire bombers modified from surplus military aircraft. Some of these aircraft are over 50 years old. Perhaps they aren't up to the job any more. Flying low in a fire bomber or a helicopter carrying several tonnes liquid has a certain element of risk. Whether from public pressure, commercial pressure or just plain inertia on occasions fire bombing operations continue when they are no longer effective.

So the Americans have not got it all right yet but there is a lot we can learn from our cousins on the other side of the Pacific. They have some excellent safety systems and some very strong programs, in particular SAFECOM and AIRWARD. There are many lessons too that we can learn from the thus far unsuccessful SAFENET system.

The 6 key activities used to deliver the Australian INDICATE safety program are reiterated below:
- Appointing an Operational Safety Manager
- Proactively identifying aviation safety hazards by conducting a series of staff focus groups
- Establishing a confidential reporting system
- Establishing regular safety meetings with management
- Maintaining a safety information data base
- Ensuring that vital safety information is regularly communicated to staff

SAFECOM uses Regional Aviation Safety Managers (and these are experienced managers with strong operational backgrounds) and reinforces the use of line supervisors in correcting problems.

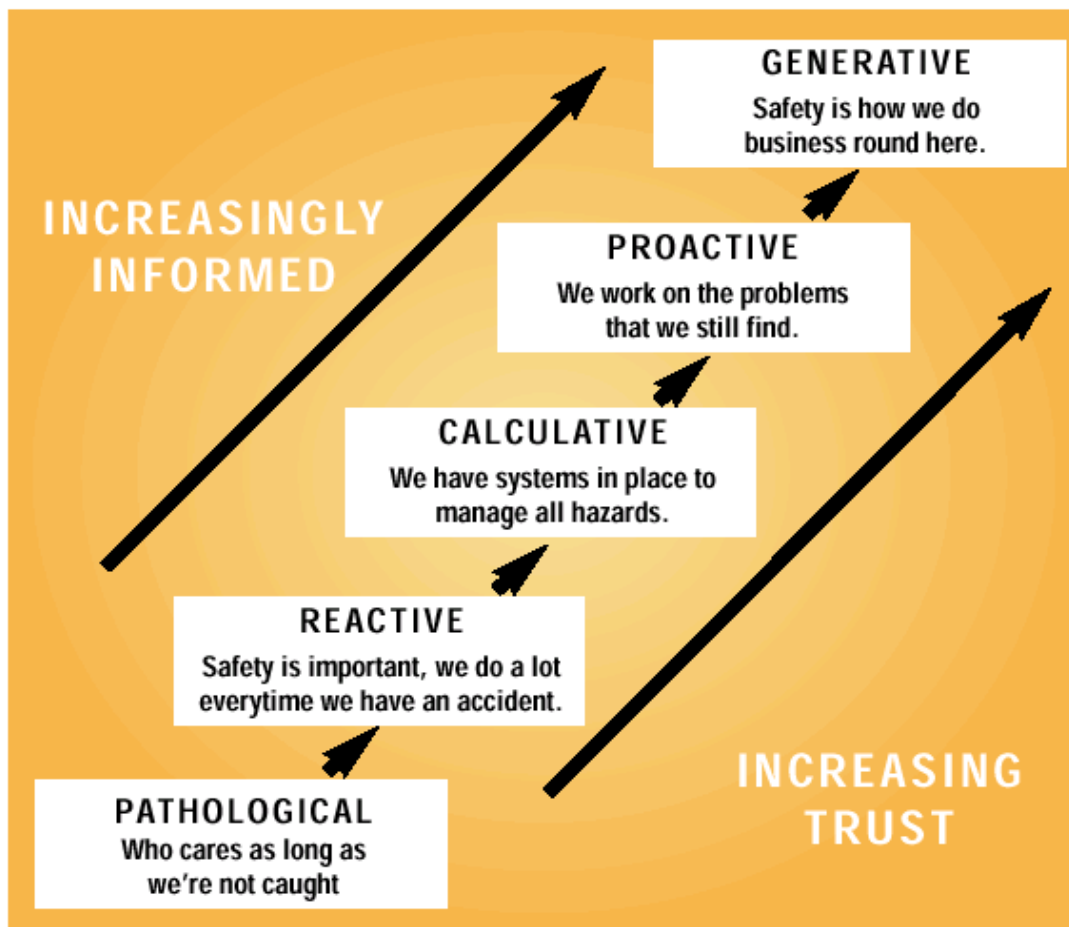SAFECOM provides a confidential reporting system and a safety information data base.

The US Forest Service SAFECOM system therefore delivers 3 of the 6 key activities of an entire safety program promoted by the Australian Transport Safety Bureau. It also passively communicates safety information to all staff and feeds other systems such as AIRWARD, agency safety alerts and local safety meetings.

The United States Forest Service SAFECOM and AIRWARD systems are recommended as being models of particular value for application in Australia. Successful adoption of these systems will require the injection of some management effort, not mere administration of a system to avoid the pitfalls experienced by the SAFENET system.

The INDICATE Safety Program promoted by the Australian Transport Safety Bureau is recommended as a framework in which to apply the above systems.

To close with a challenge, consider where your organisation sits on the safety league ladder- not in comparison to others but in comparison to how things might be.

GENERATIVE
Safety is how we do business round here.

PROACTIVE
We work on the problems that we still find.

CALCULATIVE
We have systems in place to manage all hazards.

REACTIVE
Safety is important, we do a lot everytime we have an accident.

PATHOLOGICAL
Who cares as long as we're not caught

INCREASINGLY INFORMED

INCREASING TRUST

It's a long way to the top: The evolution of a safety culture.

References:

ATSB (2001) *The INDICATE Safety Program Implementation Guide*. Australian Transport Safety Bureau

CASA (1998) *Aviation safety management, an operator's guide*. Aviation Safety Promotion Civil Aviation Safety Authority, Australia

CASA (2001) *Flight Safety Australia*. September-October 2001 Civil Aviation Safety Authority, Australia

Maurino D.E., Reason J, Johnston N and Lee R.B. (1995) *Beyond Aviation Human Factors.* Ashgate, England

Taggart W.J. (undated) *Crew Resource Management: Achiev Enhanced Flight Operations,* NASA/UT/FAA Aerospace Research Project, Department of Psychology, UT, Austin.

Appendix 1
Web addresses of Safety Systems and for further information:

SAFENET:
http://safenet.nifc.gov/

SAFECOM:
(US Forest Service)
http://www.aviation.fs.fed.us/safecom/index.htm
(US Department of Interior, Office of Aviation Services)
http://www.oas.gov/oassafty/
AIRWARDS
http://www.aviation.fs.fed.us/library/airwards/index.htm

Confidential Accident and Incident Reporting (Civil aviation, Australia)
http://www.atsb.gov.au/aviation/cair/index.cfm

INDICATE Safety Program
http://www.atsb.gov.au/atsb/indicate/index.cfm

Associated Airtanker Pilots message board
 http://www.airtanker.com/wwwboard/wwwboard.html

Appendix 2
Persons interviewed.

Name	Interview location	E-mail address	Title and agency Agency	Full Address
Susie Bates	Yosemite NP	susie_bates@nps.gov	Pacific West Region Aviation Management and Safety Officer US National Parks Service	
Sharon Battreal	Fresno		Dispatcher Fresno US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Fresno Air Attack Base 2307 N. Clovis Ave Fresno, CA 93727 USA
Terry Beahan	La Grande-John Day		Acting RASM Pacific NW Region R6 US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Portland USA
Ron Bell	Boise		Acting Forest Service Aviation Safety Manager(?) US Department of Agriculture Forest Service	US Department of Agriculture Forest Service National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Rod Bloms	Boise	rod_bloms@fws.gov	Fire Management Specialist US Department of the Interior Fish and Wildlife Service	US Department of the Interior Fish and Wildlife Service National Interagency Fire Center 3833 S. Development Ave Boise 83705 USA
Jim Boukidis	Fresno	jboukidis@fs.fed.us	Forest Aviation Officer, Sierra National Forest US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Fresno Air Attack Base 2307 N. Clovis Ave Fresno, CA 93727-1212 USA
Larry Brosnan	Boise	larry_brosnan@oas.gov	Air Safety Investigator US Department of the Interior Office of Aircraft Services	US Department of the Interior Office of Aircraft Services PO Box 15428 Boise, ID 83715 USA

Name	Interview location	E-mail address	Title and agency Agency	Full Address
Paul Broyles	Boise	Paul_Broyles@nps.gov	Chief Fire Operations and Safety US Department of the Interior National Parks Service	US Department of the Interior National Parks Service National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Wayne Bushnell	Boise	wbushnell@fs.fed.us	Safety Officer US Department of Agriculture Forest Service	US Department of Agriculture Forest Service National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Don Crompton	Baker City	dcrompton@fs.fed.us	Forest Safety and Health Official US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Baker City USA
Tammy Denney	Boise		US Department of Agriculture Forest Service	US Department of Agriculture Forest Service National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Craig Droake	La Grande	cdroake@fs.fed.us	Asst Airbase Manager La Grande US Department of Agriculture Forest Service	US Department of Agriculture Forest Service La Grande USA
Jim Eisner	Prineville		BLM SEAT Airbase Manager US Department of the Interior Bureau of Land Management	US Department of the Interior Bureau of Land Management Prineville USA
Alice Forbes	Boise	aliceforbes@fs.fed.us	Deputy Assistant Director, Operations Fire and Aviation US Department of Agriculture Forest Service	US Department of Agriculture Forest Service National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Earle Franks	Fresno	efranks@fs.fed.us	FS Hydrologist/CWN Airbase Manager US Department of Agriculture Forest Service	US Department of Agriculture Forest Service
Bob Frost	Redding	bobfrost@fs.fed.us	Dispatcher and Ramp Manager US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Northern California Service Centre 6101 Airport Road Redding, CA 96002 USA

Name	Interview location	E-mail address	Title and agency Agency	Full Address
Rick Gale	Boise	Rick_Gale@nps.gov	US National Parks Service	
Dave Garham	Redding		Retardant Contractor Firetrol	6101 Airport Rd Redding, CA 96001 USA
Gary & Meegan Garrett	Redding	ardcoinc@aol.com	Pilots DC4 Airtanker	ARDCO INC HCR 2 Box 277 Tucson, AZ 85735 USA
Brad Gibbs	La Grande	bgibbs@fs.fed.us	Blue Mt. Aviation Officer US Department of Agriculture Forest Service	US Department of Agriculture Forest Service 60131 Pierce Rd La Grande, OR 97850 USA
John Gould	Boise		Chair, Forest Fire and Aviation Safety Team US Department of the Interior Bureau of Indian Affairs	US Department of the Interior Bureau of Indian Affairs National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Rick Haggenson	Redding		Forest Service Leadplane Pilot US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Northern California Service Centre 6101 Airport Road Redding, CA 96002 USA
Barb Hall	Boise		US Department of Agriculture Forest Service	US Department of Agriculture Forest Service National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Stacey Hamilton	ECC Fresno		Dispatcher, Fresno Sierra ECC US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Fresno Air Attack Base 2307 N. Clovis Ave Fresno, CA 93727 USA
Matt Hayden	Redmond		Co-pilot T67 (CL130 Redmond)	
Russ Hurst	La Grande		Airbase Manager US Department of Agriculture Forest Service	US Department of Agriculture Forest Service La Grande
Carl Ireland	John Day		SEAT Pilot (Thrush)	

Name	Interview location	E-mail address	Title and agency Agency	Full Address
Craig Irvine	Redmond		Lead Plane Pilot US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Redmond USA
Scott Irvine	Redmond	sfisher@fs.fed.us	Pilot US Department of Agriculture Forest Service	US Department of Agriculture Forest Service 1738 SE Ochoco Way Redmond, OR 97756 USA
Gary Johnson	Fresno	Gary_R_Johnson@nps.gov	Aviation Operations and Safety Specialist US National Parks Service	US National Parks Service National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Alan King	Boise		FFAS Team Member US National Parks Service	US National Parks Service National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Tom Koenig	Redding	Copter1009@aol.com	US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Redding California USA
Karen Kufta	Yosemite	karen_kufta@nps.gov	Assistant Base Manager, Crane Flat Helibase US National Parks Service	US National Parks Service
Dennis Lamun	Boise	dennis_lamun@blm.gov	Deputy Chief of Aviation, National Fixed wing Specialist US Department of the Interior Bureau of Land Management	US Department of the Interior Bureau of Land Management National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Brian Lash	Redmond		Pilot Airtanker T68	
Jack Lee			Agency Liaison Firetrol	Firetrol 9411 S. Rio Vista Reedley, CA 93654 USA
Dennis Mayhear	John Day		Contract SEAT pilot (Thrush)	

Name	Interview location	E-mail address	Title and agency Agency	Full Address
Linda McMahon	Redding ECC	lmcmahon@fs.fed.us	Dispacher US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Northern California Service Centre 6101 Airport Road Redding, CA 96002 USA
Geoff Meyerholz	John day		Airbase Manager US Department of Agriculture Forest Service	US Department of Agriculture Forest Service
Rex Miller		rgmiller02@fs.fed.us	Assistant FMO Idaho US Department of Agriculture Forest Service	US Department of Agriculture Forest Service
Rick Moore	Fresno	rick_moore@fire.ca.us	Battalion Chief, Fresno Air Attack Base California Department of Forestry	California Department of Forestry Fresno County and Fig Garden Districts Fresno Air Attack Base 2307 N. Clovis Ave Clovis, CA 93727 USA
Dana Morris	Yosemite		A350 Helicopter Pilot Geo-Seis Helicopters	
Michael Nash	Yosemite	michael_nash@nps.gov	Park Ranger Yosemite US National Parks Service	US National Parks Service Park Ranger Yosemite PO Box 577 Yosemite, CA 95389 USA
Pat O'Bannon	Redding	pobannon@fs.fed.us	Assistant Director, Northern Operations US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Northern California Service Centre 6101 Airport Road Redding, CA 96002 USA
Tim O'Brien	Redmond		Flight Engineer Air Tanker T67 (CL130)	
Dennis Pendelton		dpendleton@fs.fed.us	Assistant Director, Applied Operations Fire and Aviation US Department of Agriculture Forest Service	US Department of Agriculture Forest Service National Interagency Fire Center 3833 S. Development Ave Boise ID 83705 USA
Alan Perriman	La Grande		Tanker Base Crew Volunteer	
Geoff Power	Yosemite	geoff_power@nps.gov	Helicopter Operations Specialist Base Foreman Crane Flat Helibase US National Parks Service	US National Parks Service

Name	Interview location	E-mail address	Title and agency Agency	Full Address
Dave Quin	La Grande	dquin@fs.fed.us	Fire Center Manager US Department of Agriculture Forest Service	US Department of Agriculture Forest Service La Grande USA
Bob Reece	Yosemite		North District FMO Yosemite NP US National Parks Service	US National Parks Service PO Box 1533 YL Yosemite National Park, CA 95389 USA
Brian Rindlisbacher	Vale	brian_rindlisbacher@or.blm.gov	Baker Station Manager/SEAT Manager Baker Oregon US Department of the Interior Bureau of Land Management	US Department of the Interior Bureau of Land Management Vale District BLM 100 Oregon St Vale, OR 97918 USA
Michelle Ryerson-Grett	Boise		Member FFAS Team US Department of the Interior Bureau of Land Management	US Department of the Interior Bureau of Land Management National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA
Ernie Saldivar	Fresno	ernie_saldivar@fire.ca.gov	Battalion Chief, Fresno County and Fig Garden Districts Emergency Command Center California Department of Forestry	California Department of Forestry Fresno County and Fig Garden Districts Emergency Command Center 2311 N. Clovis Ave Clovis, CA 93727 USA
Donald Sand	Redding		Battalion Chief Smokejumper Operations US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Northern California Service Centre 6101 Airport Road Redding, CA 96002 USA
Duane (Doug) Sly	Vale		SEAT (Dromader) Pilot Sly's Aerial Spraying	Sly's Aerial Spraying PO Box 754 Platte, SD 57369 USA
Jason Steinmatz	La Grande		Dispatcher(?) La Grande US Department of Agriculture Forest Service	US Department of Agriculture Forest Service

Name	Interview location	E-mail address	Title and agency Agency	Full Address
Cecil Steinson	Redding		Mixing base supervisor? US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Northern California Service Centre 6101 Airport Road Redding, CA 96002 USA
Bruce unknown	Idaho City		Long ranger Pilot Idaho City Contractor to? US Department of Agriculture Forest Service	Albany USA
Carl unknown	La Grande		P2Y Pilot Minden Air Corporation	Minden Air Corporation
Judy unknown	Idaho City		Helicopter Crew Member US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Mississipi USA
Ray unknown	Idaho City		Helicopter Crew Member US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Mississipi USA
Dianna Vancouler	Redmond		Assistant Airbase Manager, Redmond US Department of Agriculture Forest Service	US Department of Agriculture Forest Service Redmond, OR USA
Del Walters	Redding	del_walters@fire.ca.gov	Assistant Chief Shasta County Fire Department California Department of Forestry	California Department of Forestry 875 Cypress Ave Redding, CA 96001
Bob Webb	Redmond		Pilot T67 (CL130)	
Asher Williams	Boise	awilliams01@fs.fed.us	National Aviation Operations Officer US Department of Agriculture Forest Service	US Department of Agriculture Forest Service National Interagency Fire Center 3833 S. Development Ave Boise, ID 83705 USA

Appendix 3
Issues canvassed during interviews
<u>For users of systems in US</u>
Record persons/groups name, follow up contact, field of expertise, date, location of interview

Do you follow the various postings of SAFECOM, SAFENET, AIRWARD?
      Is there a particular category that you follow

Have you lodged or been the subject of a SAFECOM, SAFENET or AIRWARD?
      How did that make you feel (Satisfied, dissatisfied, aggrieved, proud)
      Did anything change?

What is the difference between SAFECOM and SAFENET? Separate the company line from real perceptions

Have you got Internet access, is it an effective means of examining reports and summaries?

Do you read the summaries of SAFECOM's, either annually or more frequently?

Can you name an incidence where a SAFECOM or AIRWARD lead to changed behaviours of yourself or your crew?

Have you encountered vexatious reporting in the systems?
      How was it dealt with?

<u>For managers and administrators</u>
How much effort is required to maintain the systems and to search for patterns (like incidents)?

What procedures or practices have been changed due to these systems?

Have you encountered vexatious reporting in the systems?
      How was it dealt with?

Do you read the summaries of SAFECOM's, either annually or more frequently?

How are the summaries used to influence policy and practice?

How was the system promoted and introduced?

How is system compatible with NTSB reporting

How were the systems introduced and promoted initially?

Appendix 4
Example of a SAFECOM (US Forest Service)

SAFECOM
AVIATION SAFETY COMMUNIQUE

SAFECOM Tracking #:	00-403

EVENT

Date:	7/16/00	Local Time:	2020	Injuries:	No	Damage:	No

Location: Little Johnson Creek 2 Fire   State: **Montana**

Agency Involved: **Region 1**   Other:

MISSION

Type: **Fire, Passenger Transport**   Other:

Procurement: **CWN**   Other:

Persons Onboard:	**4**	Special Use:	**No**	Hazardous Materials:	**No**

Departure Point: **Helispot #2**   Destination: **Moose Lake Helibase**

AIRCRAFT

Tail Number: **N5001K**   Manufacturer: **Bell**   Model: **206B3**

NARRATIVE Incident occured during crew shuttle on the Little Johnson Creek 2 Fire. The helicopter lifted off of the helispot while the HECM was still attempting to close the rear passenger side door. Marshaller was pointing toward another incoming helicopter instead of using proper hand signals to assure that the ship remained on the ground until all personnel were clear of the ship and the doors were secured. As the pilot was lifting he became aware of the situation when the HECM exited forward and to the left of the rising helicopter. The mission was completed but upon arrival at the helibase I found that the door was not fully latched. Fortunately the ship rose vertically upon departure and did not have any forward motion when the incident occured.

CORRECTIVE ACTIONS This incident occured on the last flight of the day. All helibase personnel and flight crews were debriefed and proper marshalling procedures were discussed. Emphasis was directed on not becoming complacent during repetative missions. The need for positive visual and/or radio COMMUNICATIONS was stressed. RASM: Slow Down - Look Around! There's even an "Aviation Safety Poster" specific to this occurance.

Appendix 5
Example of a SAFENET and a SAFECOM report of the same incident
SAFENET report:

SAFENET
ID #5C3P2ZSAFE

Wildland Fire Safety & Health Reporting Network
Report unsafe situations in all wildland fire operations.

REPORTED BY

Name : *(Optional)*   Phone : *(Optional)*
EMail : *(Optional)*   Date Reported : 07/14/2002
Agency\Organization : USFS
State Agency :
Other Agency :

EVENT

Event Date :	07/13/2002	Local Time :	1600
Incident Name :	POORE	Incident Number :	NV-HTF-1569
State :	CA		
Jurisdiction :	USFS	Local Unit :	CRD

Incident Type :   Incident Activity :   Stage of Incident :
Wildland   Mop Up

Position Title :   Adfmo
Task :   Ic
Management Level :   3
Resources Involved :   Engine Crew

SAFETY/HEALTH ISSUE

Brief description of concern/condition or potential issue:
Unannounced & unrequested retardant drop on staffed fire, hitting line personnel.

CONTRIBUTING FACTORS

Contributing Factors : Communications
Human Factors :
Other Factors :
Air Attack had several Tactical Air aircraft in town working a Type II incident approximately 15 air miles to the southeast. We were in a local lightning plan working approx. 12 small lightning fires with a helicopter, crews and engines. Apparently, Air Attack was not briefed prior to his mission as to the big picture operations in the surrounding airspace. There was no Commo between the Air Attack or his aircraft and us.

ENVIRONMENT

Describe: (Weather, Fire Behavior, Fuels, Terrain, Footing, Road Conditions, etc.)
Weather at the time was being influenced by extreme thunderstorm activity. We were in the process of bringing our helicopter back to the helibase due to lightning.

NARRATIVE

Describe in detail what happened including the concern or potential issue, the environment (weather, terrain, fire behavior, etc), and the resulting safety/health issue.
An S-2 Tanker that Air Attack had under his command made a retardant drop on a fire that was staffed with personnel and engines supporting hoselays. The drop was a direct hit on the fire and personnel. There was no attempt by the aircraft to contact anyone on the ground. The ground forces were taken by total surprise since the only aircraft that was supposed to be in the area was our helicopter. Action was taken without coordination with dispatch. Air Attack attempted to abort the drop at the last minute when he was people on the fire but it was too late.

SITUATION REVIEW

Reporting Individual: please list anything that, if changed, would prevent this safety issue in the future:
Communication and coordination. Following proper procedures prior to taking action on fires. Dispatch and Tanker Base giving briefing to Air Attack about big picture, surrounding area activities prior to mission. Ensure that all aircraft are up on proper Victor and command frequencies.

SUGGESTED CORRECTIVE ACTION

Reporting Individual : Please list anything that, if changed, would prevent this safety issue in the future.

CORRECTIVE ACTION

Please document how you tried to resolve the problem and list anything that, if changed, would prevent this safety issue in the future.
Ensure that all personnel including Dispatch are following written pre-planned procedures that describe communication plans that detail contacts to be made prior to entering Fire Zone Airspace. This would help avoid airspace intrusions. Retardant or water should not be dropped on fires prior to making contact with ground forces. If there is no contact the drop should be abor
appropriate dispatch center can guarantee the drop zone is clear.

Appendix 5 cont.
Example of a SAFENET and a SAFECOM report of the same incident
SAFECOM report:

SAFECOM AVIATION SAFETY COMMUNIQUE	SAFECOM Tracking #:	02-507

EVENT

Date:	7/13/02	Local Time:	1600	Injuries:	No	Damage:	No

Location: Poore Fire   State: California

Agency Involved: Region 4   Other:

MISSION

Type: Fire, Retardant Drop (Airtanker)   Other:

Procurement: Cooperator   Other:

Persons Onboard: Special Use: Hazardous Materials:

Departure Point: Destination:

AIRCRAFT

Tail Number: Unknown   Manufacturer: Grumman   Model: S2

NARRATIVE

AN S-2 TANKER UNDER COMMAND OF AN ASM MADE AN
UNANNOUNCED-UNREQUESTED RETARDANT DROP ON A FIRE THAT WAS STAFFED WITH
PERSONNEL AND ENGINES SUPPORTING HOSE LAYS. THE DROP WAS A DIRECT HIT ON
THE FIRE AND GROUND PERSONNEL. THERE WAS NO ATTEMPT BY THE AIRCRAFT TO
CONTACT PERSONNEL ON THE GROUND. WE WERE IN A LOCAL AREA LIGHTNING PLAN
WHICH DESCRIBES THE AREA COVERED AND PROCEDURES FOR ALL AIRCRAFT
ENTERING THE AREA TO ADHERE TO. WE HAD ONE HELICOPER ASSIGNED TO OUR FIRES
AND THAT WAS SUPPOSED TO BE THE ONLY AIRCRAFT IN THE AREA. I WAS NOT
NOTIFIED BY DISPATCH THAT ANY ADDITIONAL AIRCRAFT WERE ENTERING OUR AREA.
THE AIRCRAFT INVOLVED WERE SUPPOSED TO BE WORKING A TYPE II INCIDENT
APPROXIMATLY 15 AIR MILES SOUTHEAST. THEY WERE APPARENTLY TRYING TO GET
BACK TO THE TANKER BASE DUE TO WEATHER WHEN THEY SPOTTED OUR FIRES. SINCE
THEY WERE APPARENTLY NOT BRIEFED BY DISPATCH OR THE TANKER BASE AS TO OUR
ACTIVITIES THEY ASSUMED THAT THEY WERE DROPPING ON NEW UNSTAFFED FIRES.
THE ASM DID NOT SEE THE GROUND PERSONNEL UNTIL THE S-2 WAS ON SHORT FINAL
MAKING THE DROP. THIS FIRE WAS IN MOP-UP STAGE WHICH RAISES THE QUESTION AS
TO THE URGENCY AND NEED FOR SOMEONE TO MAKE A DROP AT ALL WITHOUT
MAKING CONTACT WITH THEIR DISPATCH CENTER FIRST.

See following page for corrective action

Appendix 5 cont.
Example of a SAFENET and a SAFECOM report of the same incident
SAFECOM report cont:

CORRECTIVE ACTIONS

FOLLOW PROPER PROCEDURES PRIOR TO TAKING ACTION ON FIRES WITH AIRCRAFT. DISPATCH AND TANKER BASES NEED TO MAKE SURE EVERYONE IS BRIEFED EACH MORNING AS TO ACTIVITIES. ALL AIRCRAFT NEED TO BE UP ON THE APPROPRIATE COMMAND AND VICTOR FREQUENCIES. AIRCRAFT SHOULD NEVER TAKE ACTION ON FIRES WITHOUT MAKING CONTACT WITH THE IC ON THE GROUND OR THRU DIRECTION FROM THE DISPATCH CENTER GUARANTEEING THE FIRE IS UNSTAFFED AND CLEAR TO DROP...RASM Remarks: I've called Minden Dispatch to get more information and will be doing further follow-up action on this before comment, 7-16-02. Please see the additional comments that were sent to me, thank you for the further clairification and follow-up! ATTACHMENT:I finally had a chance to get together with Lead XX, & Air Tactical Supervisor on Safecom # 02-507 submitted for the Poore Fire on 7/13/02. Lead XX was committed to the Gate Complex and had Two heavy air tankers and an S-2 holding North of the fire with the National Guard Chinook coming into the area. There was heavy cell activity and wind and while everyone was orbiting for the Gate fire there were a number of new starts(4 or 5) popping up in the immediate vicinity. Lead XX was concentrating on one new start which had people on it and he was in touch with Minden Dispatch on trying to plot some of the new fires and ascertain if any of them were staffed. The pilot of the S-2 was getting low on fuel and said that he was checking out one fire that looked like it had potential and had made a low pass on the fire and concluded that it was unmaned. He relayed to Lead XX that he could drop his load on this fire and then head back to base for fuel. The weather was deteriorating and all the Tankers were heading back to Base to regroup and wait out the weather and Lead XX said that the S-2 could go ahead and drop the load and head back. The S-2 dropped half of his load and while doing so relayed to Lead XX that he did in fact see yellow shirts on the fire. He left the area with half his load still on board. The result was some painting of Engines and personnel with retardant although I believe the tanker was at correct altitude so no injuries were sustained. There is always the possibility of retardant on equipment and people but the fact that there was no communication and forewarning is definitely a big safety concern. To add to the Corrective Actions on the safecom the Air Tactical Supervisor agreed he had made a marginal call on letting the Tanker drop without being overhead and trying to contact the ground to see if there were any personnel there. Also, when the Forest goes into their lightning plan there seems to be some confussion on operational procedures in their area. We have had a number of other problems with this same scenario and there needs to be better communication between Minden Dispatch and the Forest on where their fires are and where the boundaries are. There is no TFR in the area, it's just a local agreement but when we have multiple fires and other aircraft are responding to IA fires in the same area there seems to be still some confusion over frequencies and tactics. There needs to be some more work done on the implementation of the Forest's lightning plan which we will follow up on. This a huge concern of mine and is not unlike our dispatching aircraft to Boarder Area fires where there is a high potential for miscommunication and two aircraft coming into the same area on different frequencies unaware of the others presence. We have worked on this in Dispatch and developed a Boarder area plan so I think we need to readdress the Forest lighting plan and get some more clarification on it. I am also running down the Tanker number and will touch base with the Pilot on protocol for unsupervised drops on fires. If there are any further questions or follow-up please feel free to contact me at 775-885-6182. Carson/Sierra Front Aviation Manager No further action.

CDF GREEN SHEET

Investigation summaries of serious injuries, illnesses, accidents and near-miss accidents

DEPARTMENT OF FORESTRY AND FIRE PROTECTION

Shasta-Trinity Unit
North Region

July 28, 2001

Near-Miss Incident
Powerhouse Fire Initial Attack

SUMMARY

On Saturday, July 28, 2001, at approximately 1600 hours, a Shasta County Fire Department (SHS) engine crew making initial attack on a vegetation fire was involved in a near-miss incident resulting in minor burn injuries to two firefighters and fire damage to their engine. The injuries occurred as firefighters ran along a roadway to escape excessive heat as the fire crossed the road at their position. Neither firefighter required medical treatment and both immediately returned to duty on another engine.

CONDITIONS

The incident occurred on Pit River Powerhouse #5 access road near the community of Big Bend in Shasta County. The legal location description is Section 11, Township 36N, Range 01W, MDB&M. The road is a well-maintained paved county road. The cover type is mixed conifer forest. The terrain is moderate to steep in the Pit River Canyon.

WEATHER

The weather was clear, warm, and dry and the surface winds were light. The general winds over the canyon were westerly at 15-20 miles per hour. The relative humidity was in the teens and the temperature in the 90's. The weather conditions were normal for the fire season and are not considered a significant factor in this event.

SEQUENCE OF EVENTS

On Saturday, July 28, 2001, at 1526 hours, the Shasta-Trinity Unit of the California Department of Forestry and Fire Protection dispatched units to a reported vegetation fire on the Pit River Powerhouse #5 access road near the community of Big Bend. The first arriving ground units were Shasta-Trinity National Forest (SHF) Engine 53 (E-53), SHS Water Tender 70 (WT-70), and SHS Engine 570 (E-570), both of the latter from the Big Bend Volunteer Fire Company. All responded from Big Bend. The apparatus stopped on the paved road above the fire. At this time the personnel could only see an area of ground fire about 40' X 100' with flame lengths about 2 feet and a slow rate of spread.

SHF E-53 (3-person crew) began a hose lay from the road downhill toward the left shoulder of the fire, which was on a bench about 50 feet below the road. WT-70 (2-person crew) established a supply line to E-53 to support its hose lay. E-570 (5-person crew) stopped about 200 feet behind the water tender and began a hose lay downhill toward the right shoulder of the fire, which was about 60-75 feet below the road. At this time, an S-2F air tanker made a drop of ½ load (400 gallons) on the fire in the immediate vicinity of E-53 and WT-70.

As the crew of E-570 was making their way down the road embankment with a charged 1-1/2" preconnected hose line, they noticed 5-6 small spot fires between them and the main fire. They were not able to see the heel of the fire, where torching in pine and fire trees was occurring. Suddenly, the fire became very active, with torching of trees and short-range spotting, and made two simultaneous runs uphill toward the road, crossing the road over the apparatus.

The crews of E-53 and WT-70 retreated to their vehicles and quickly moved down the road about 100 feet and got out from in front of the fire. The crew from E-570 retreated to the far side of the road, while trying to protect the engine with the 1-1/2" hose. The heat from the fire torching in the trees below the road became too intense and melted the hose. The crew escaped by running uphill along the road beyond the right flank of the fire. There they encountered a civilian vehicle and CDF Engine 2463 (E-2463), which took them out of the fire area.

INJURIES

One firefighter sustained a minor blister on the right elbow and singed hair on the back of his head. Another firefighter sustained singed eyebrows and hair on the back of her hand above the glove. All firefighters were wearing their full compliment of wildland fire personal protective equipment. They returned to their station, got a second engine, and returned to the fire. None required medical treatment.

DAMAGES

Engine 570 is a surveyed CDF Model # 5 Type III engine on an International 1700 4WD chassis, which had recently been refurbished. It sustained moderate fire damage to the left front side, left front tire, windshield, lightbar, and interior, but is repairable.

SAFETY ISSUES FOR REVIEW

1. Incidents that happen on smaller fires or on isolated portions of larger fires.

2. Fires that look innocent before "flare-ups" or "blow-ups". In some cases, tragedies occur in the mop-up stage.

3. Initiate all actions based on current and expected fire behavior.

4. Fire not scouted and sized up = "Watch Out!"

5. Building fireline downhill with fire below = "Watch Out!"

6. Unburned fuel between you and the fire = "Watch Out!"

7. Attempting frontal assault on fire = "Watch Out!"

SAFE ATTITUDE AIRWARD NEWS

In Recognition of Professional Performance during a Hazardous
Aviation Event or Significant Contribution to Aviation Mishap Prevention

August 2001

Nice Catch

Helicopter Remains

Allen Johnson, acting as the Safety Officer on a Search and Rescue mission, intercepted Geffrey Davenport, Electronics Technician for the Forest Service, before boarding a helicopter. Forest Service employees are restricted from flying on uncarded helicopters like this one. This helicopter crashed with four crewmembers and two Office of Emergency Services' technicians. Johnson's quick feet and wise decision prevented what could have been a worse scenario. Safety rules are made to keep people safe. This boarding restriction proves the success of this field play. Nice catch, Allen! No SafeCom submitted

Faster than a Speeding Bullet

Pat Loe, Region 9 pilot, experienced some complications while conducting a forest insect survey on a DHC-2 Beaver floatplane. The floatplane experienced a vibration and trace of oil on the windshield. Pat didn't waste any time messing around. Notification was made to the forest dispatcher that he was redirecting to Devil Track Lake. While descending the vibration worsened. Faster than a speeding bullet, he changed direction again and executed a precautionary landing on Northern Light Lake without incident. Excellent moves, Pat!

USFS SafeCom 01-283

Pat Loe (left) and Mike Hopf (right)

Home Run

Kevin Brown (left) and
Hunter Ridenhour (right)

During rappel proficiency training at the John Day Oregon Base, the helicopter experienced mechanical failure during flight. Kevin Brown, spotter, had begun rappel training when he heard a noise that led him to believe it was a lost hydraulic pump. Hunter Ridenhour, pilot, decided to make the play of the day by stealing a base and sliding into home plate. He quickly turned the aircraft back to the airport while Brown prepared the crew for a hardball landing. The helicopter slid to a stop on the taxiway and the crew departed. Brown observed smoke from a grass fire that this incident may have caused, notified Ridenhour and he contacted the base manager for initial attack action on the fire. Nice slide, guys! USFS SafeCom 01-373

Good Call

Jamie Tackman, leadplane pilot, made a critical decision to stop retardant aircraft operations and warn the firefighting helicopters of the erratic winds in the canyon they were flying. Jamie believed that had the airtanker continued its run it may not have been able to pull out of the narrow canyon. Good job, Jamie! USFS SafeCom 01-317

No picture available

SAFE ATTITUDE

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