A SAFETY MANAGEMENT SYSTEM MADE EASY

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Safety Management Systems or SMS are a formal means of lowering human error and thus, the accident rate. A Safety Management System is nothing more than learning to *"sweat the small stuff so you never have to sweat the big stuff."* (G. Dupont) We do this with a **formal, systematic, accident prevention program that manages Safety risks through all aspects of the company.** (G. Dupont). The underlying end goal of any SMS is to cause the company to develop a "Safety Culture" without destroying the "bottom line" (profit). The following is a SMS that can do just that.

The model that will be presented was developed with the assistance of the aviation industry in 1995 in order to understand where human factors training fitted in.

A human factors training program for aviation maintenance personnel was developed in Canada in 1993 in order to answer one of the recommendations made by Justice V.P. Moshansky in his inquiry into a fatal airline accident. At that time there was no legal requirement for any company to do this training and thus it appeared to be an orphan with the only justification for a company to carry out this training was a gut feeling that it was the right thing to do. Continental Airlines was the only airline doing any form of human factors training for its maintenance personnel at the time.

The model (See Appendix A) was developed to illustrate how human factors training played a key role in developing what was then called "The Big Picture." Let's look at the various pieces of the puzzle and their relationship in a SMS.

Human Factors Training

Human factors training is in the middle of the picture because it interfaces with all the other pieces of the puzzle and is a key piece. This training will have a positive impact on the rest of the picture but it's only one piece of the complete picture. By itself, training will assist the person on the floor to avoid an error he/she never intends to make but it can do a lot more to reduce errors to As Low As Reasonably Practical (ALARP).

The **human factors training** has to relate to the personnel and what he/she does. This is being accomplished in many companies with the incorporation of the Human Performance in Maintenance or Ground Crew (HPIM) Part 1 workshops. The **human factors training** is the key to any SMS as it provides everyone with an understanding of why good people including themselves can make errors and will help the rest of the puzzle pieces to fit together.

Some important points to know about the training are:

1. It will assist with the implementation of the other puzzle pieces
2, Thus it should be one of the first to be implemented
3. It needs to be ongoing and not a one shot deal to remain effective
4. All personnel require the training; from the CEO, management, maintenance, pilots, secretaries, stores, even the janitor.

Since over 80% of all aviation accidents are due to human error, it is very important for all to know what they can do to reduce this number. The right HF training will assist in the "buy-in" of the rest of the SMS

Company Culture

A **Company Culture** can be difficult to measure but is a key component of a SMS and a Safety Culture. A **Company Culture** is regarded as *"the way things are done around here"* while a Safety Culture must have these key elements. It is a company where:

✓all believe that Safety does not have to come at the cost of productivity or profit
✓ Safety is treated seriously by management
✓ Safety is an integral part of the way the company operates
✓all company employees are trained and encouraged to think and work Safely
✓ Safety goals are set and all work toward their achievement
✓the company has a framework to accomplish the above (Safety Management System)

Components of a company Safety Culture

a) Mission Statement –

1. Does your company have a mission statement?
2. Does it relate to the day to day reality of the workers?
3. Does it include the word Safety in it?

Check yours and see if it meets these three criteria.

b) Safety Policy –

1. Does your company have a Safety policy?
2. Does it spell out everyone's responsibilities?
3. It is proactive?
4. Is it seen everywhere?
5. Is it signed by the CEO and other persons of high accountability for Safety?
6. Is it reviewed periodically?

All the responses must be positive in a true Safety culture.

Human Factors Incident Investigation

A **human factors incident investigation** calls for looking beyond the man and asking "why" until there are no more "whys." It calls for looking at the "preconditions" and management latent conditions that may have contributed to the "active failure." (See Appendix B) Studies by Boeing indicate that 70% of the time, when a human error is made (active failure) the fix (Safety Nets) is in the management latent conditions. This based on their MEDA (Maintenance Error Decision Aid) investigative tool results.

For the **HF Incident Investigation** to work there must be trust that being open and honest will not result in disciplinary action except in clearly exceptional cases. Thus this module must include an

a) Administrative Policy –

The administrative policy will spell out that it wishes to learn from our errors and as such will treat normal human error and even at risk (negligence) as learning outcomes. Only recklessness will result in a disciplinary outcome. Thus human errors will for the most part be treated as learning outcomes.
For Example

Normal Error - The unintentional forgetting to do something or doing something the wrong way. There was no intention to make the error.
i.e. Forgets to put the oil cap back on or forgets to put the landing gear down.
This is the majority of human error and is treated as a learning outcome, i.e. What can we do to prevent it from happening again.

At Risk Error - The persons knows he should do something but fails to do so thinking there is little or no risk in what they are doing. This is harder to treat as a learning outcome but the key here is *"Did the person realize the risk in what they were doing?* i.e. a pilot fails to visually check the fuel prior to departure even though the regulations say he must, as he knows that it was full the night before and they are running late. Besides everyone does it at times.

The error made was intentional but the person failed to recognize the potential seriousness of the risk. Often the same action had been taken with no adverse results and the reason for the error was to benefit the company not the individual. Here a very useful learning outcome can be obtained.

Reckless Error - The person knows there is a significant risk and chooses to do it anyway. i.e. The pilot chooses to over-fly an airfield even though both his fuel gauges read near empty or a person chooses to come to work drunk. Here the person made a conscious decision to disregard the consequences that a normal person would never do. There still can be a learning outcome but discipline may be required.
Even then ask these three questions in determining the amount of discipline.

1. Was the act deliberate with a reasonable knowledge of the consequences?
2. Does the person accept responsibility?
3. Is the person likely to do it again?

Keep in mind the purpose of discipline is:

to ensure that it doesn't happen again.

The administrative policy is not an easy one to develop but is a must if the employees are to trust the management and come forward with their errors and near errors.
If it is perceived that to admit to an error will likely result in punishment, then the SMS will have a major flaw. Every employee wants discipline as the group "sense of justice" does not like to see a unrepentant risk taker get away with a callous disregard of the regulations. This very small minority is in the wrong vocation if they fail to see the error of their ways.
If they are part of the problem, they can be part of the solution or they can depart.
Everyone must know where that line is.

Because discipline will rarely be required from a **HF Incident Investigation**, it should be small part of the Administrative policy.

b) Reporting Policy

A SMS requires a reporting policy in order to learn from near incidents before they become an accident. These can be called "Free Lessons" as they enable an organization to take corrective action without having

the accident that precedes most corrective actions today.
This policy will serve to bring to light Hazards (anything that has the potential to cause you grief) that can then be analyzed for risk. This policy has to be non-punitive except for the exception spelled out in the administrative policy and it has to be widely understood and believed by all in the company.

Risk & Incident Data Analysis 
Another key component of the SMS is the **Risk & Incident Data Analysis**. We are very adept at keeping close track of failures in equipment and this data has enabled us to predict with reasonable certainly, when a part is likely to fail.
We must now begin to do the same with human error. At first thought, this appears to be a daunting task. Yet it is in this area that 70 to 80% of all accidents causes derive from and where a regulatory body will look as their major basis of determining if your SMS is working as desired.
If the database is empty or near empty. It is not working.
If the database is full but with many repeat incidents. It is not working.
If the database has a reasonable number of entrees with recommendations carried out and very few repeat entrees, then the database analysis is working.

The properly used database will provide a clear picture of where the most errors are occurring and where to prioritize resources.
The free lessons will provide the opportunity to come up with a solution before the problem becomes an incident.

a) Risk Assessment -
The use of the database will call for a formal risk management procedure to determine and deal with the most hazardous of hazards first.
When hazards have been identified, there must be criteria and a system to assess the level of risk. This usually is expressed in terms of severity and probability. Some will also add frequency or level of exposure. What must also be looked at is the benefit. When risk is taken it is usually for a benefit and it should be looked at to arrive at a Risk Quotient.
The risk quotients should then be prioritized with cost vs. benefit analyzed.

The database will indicate what is working and what requires a different solution or more resources.

The database can indicate where more training is appropriate as well.

Used correctly it will play a big role in lowering the incidents that can lead to accidents.
Remember: Anyone can make an error but only a fool (individual or company) makes the same mistake twice.

Feedback 
Every piece of the puzzle is important but f**eedback** is a must if the SMS is to work. All the other pieces can be in place but without employee participation, it will be doomed to be just another failed experiment. People need to feel that their thoughts and ideas are being considered and so they should be. They are the ones that, as they say, *"are at the coalface"* and have information that management has no knowledge of.
They are the ones who live the policies and have to make them work or work around them.
They are the only ones that can make a SMS work.

a) Goal Setting -
Management must set a Safety goal that is reasonable and attainable. (i.e. A 30% reduction in error damage within the next five years) Everyone must know and be actively working to achieve this goal.

b) Measure of Success –
There must be a means to measure the success of the initiative. The usual way is to compare error costs in the past with present costs. An increase in hazard reports is a measure of success. Safety actions implemented are another measure of success. All these should be made known to all the stakeholders.

An occasional Safety Review (rather then audit) with a Safety survey can help ensure that nothing is being ignored, missed or misunderstood.

Feedback will serve to educate and promote the vital teamwork that SMS requires. A bonus from positive **feedback** is improved morale of employees which translates into improved productivity.

Feedback can be in the form of a regular Safety meeting of all if the company is small to a regular newsletter that is devoted to Safety. Company newsletters are a modern day must. They should serve to inform, educate and motivate.

Positive **feedback** pays dividends for everyone. Even when an error occurs, we can let everyone know in order for him/her to avoid making the same error. It can take a lot of nerve to air the "dirty" laundry, but if it is a lesson we can all learn from, then it should be there.

Educational articles should also be part of the newsletter in the form of simply written articles on topics like stress etc.

Cartoons can be a part of it in order to encourage reading.

Letters to the editor should be encouraged with questions being answered. Stats on how we are doing are just one of the means of helping to make the employee feel that they is an informed part of the company.

Emergency Response -
In spite of everyone's best intentions, there will be occasions when an error is made. If the error is major then a recovery plan must be in place. This recovery plan is better called an **Emergency Response Plan (ERP).**

The **ERP** can be critical to the survival of the organization. It must spell out what must be done and who will do it in the unlikely event that a major accident occurs. It is very important that ALL employees know their role in the plan. Every person has a role even if it is to know who to refer news media enquiries to rather than comment themselves.

Feedback to the employees is also critical at this point and if there are company fatalities, grief counselors may be required to assist employees closest (or perceive they are) to the error cause.

The **ERP** must be practiced and revised as necessary. It must be periodically updated to ensure the contact numbers, persons and procedures are current.

It is something that everyone hopes is never required but if the unthinkable does occur, the company and all its employees will be able to say with all honesty: *I don't understand how this could happen as we are always striving to be the Safest we possibly can."*

Some Conclusions
The arrows in this model go endlessly around the circle indicating that the whole exercise is not a one shot deal but must be constantly worked on to improve.

Like any initiative, it must have complete management support in order to be successful.

It will take about two years to completely implement the system.

A Safety Management System is the next logical step to tie in previous initiatives into one homogenous system.

If you implement a SMS as designed, you will have a Safety Culture within your organization where everyone takes Safety seriously.

Remember:
If we **"sweat the small stuff we may never have to sweat the big stuff."** G. Dupont

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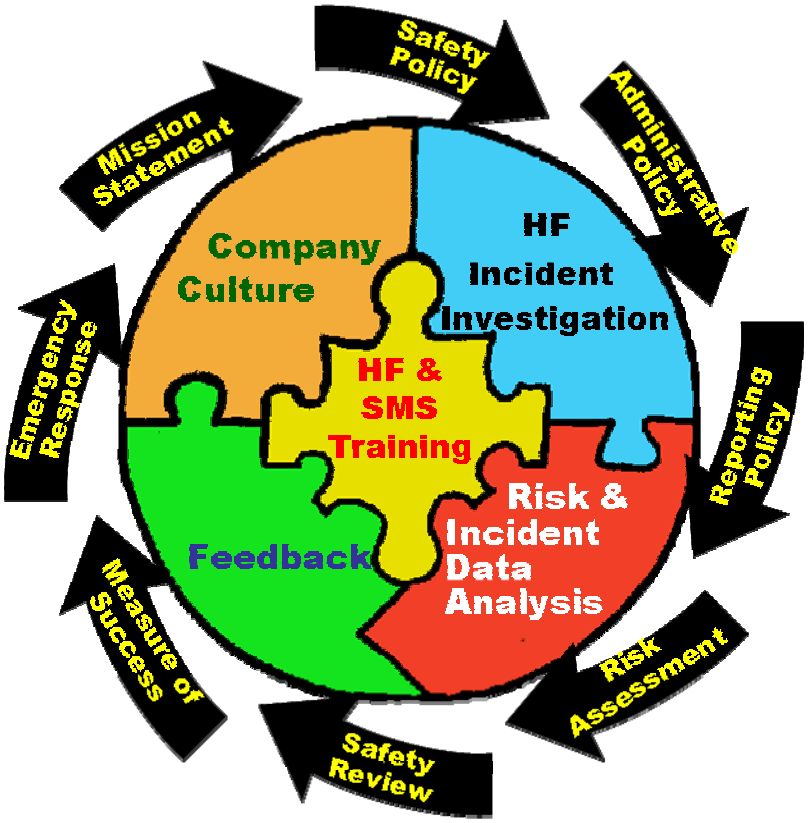
Appendix A – The Big Picture or a Safety Management System Model

A Dupont Model 1995



Appendix B – The Misfortune Murphy Model