SAFEX NEWSLETTER

No. 37, 2nd Qtr. 2011

Never relax on safety

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This is your Captain Speaking

Tobie Louw - AEL Mining Services

Tobie Louw is an executive member of the South African based explosives and chemicals group, AECI and is CEO of AEL Mining Services. AEL Mining Services was established in 1896 and has built a presence in over twenty countries and forty five locations. The company has developed technologies, built plants and run operations covering all aspects of explosives in countries often described as the most challenging safety-wise. His career has covered explosives, chemicals, food and pharma with a grounding in engineering, operations, sales, marketing and general management. Tobie has a passion for working with people and making a positive impact. He lives in Johannesburg with his wife and three children.

My personal philosophy and approach to safety and health management which I was invited to share in this issue of the Newsletter can be summarized as:

"Safety in business speaks to the universal human value of respect. It is a lighthouse of sound leadership. It is a challenge of the highest order. It's not a comfortable optional extra. It impacts positively beyond the trend graphs of safety statistics when you get it right. Getting it wrong will be devastating."

The achievement of the highest level of safety and health management remains both a formidable and a humbling challenge. The level of effort required to adequately manage safety and health is most often underestimated and not appreciated. In addition, the increasing standards, regulatory environment and customer expectations invariably render our management models of today not fully adequate for tomorrow's challenges.

In this fast changing environment some key principles and simple models however remain timeless and provide a focus for the journey. The general simple model and principles I've adopted to take the message into the workplace is based on two fundamental capabilities:

- The professional capability within an organisation to set the required safety level; and
- The behavioural capability of the organization to not only embed in it but continually improve it.

A company's professional safety capability is the quality of its professionals and line management upon whom it relies to set all safety standards; to ensure that all assets and processes are capable and safe; and to lead and drive further improvements. They include the safety experts, engineers, process technologists and product designers to mention a few. If the professional capability is not in place you fight a losing battle to get the behavioural capability right. Professionals are, therefore, the foundation of an organization's safety efforts which makes investment in professional development critically important. Any deterioration in safety professionalism will not show in your safety statistics until it's too late. When Warren Buffet was asked how large companies fail he replied "slowly, slowly, suddenly". Safety professionalism within an organization is no different. My task is to ensure this team is well defined, well resourced, has positive team dynamics as well as great pride in their professionalism and ability to lead safety and set standards within the organization.

(continued on next page)

The second part of my basic framework for safety management is no surprise. It concerns human behaviour – a company's capability to run itself the way it knows it should and to keep it tight in the far reaches of all its activities and staff. I'll just add one thing to this well researched topic. Over ten years ago I was looking for a visual image to light up the safety culture of a chemicals company I was running. I found it in the following. I spread the word that it's possible after spending three minutes with anyone to tell whether the safety switch in their head is firmly "on" or firmly "off". It's surprisingly effective because it implies that safe behavior is in fact a very visible thing and it can't be hidden—it is actually a genuine personal value. I was surprised by the response.

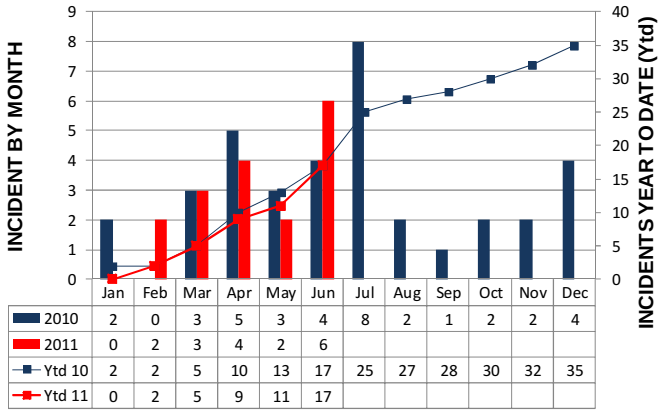
Incident Reporting

Monitoring our Reporting Performance

"Every incident or near-event that is not reported is a lost learning opportunity. You can save a life by reporting them."

SAFEX learns from its members' experiences through the incident reports we receive. By applying these lessons we can prevent similar incidents recurring. That is why we track our incident reporting performance as follows:

ALL INCIDENTS REPORTED: Ytd 2010 vs 2011

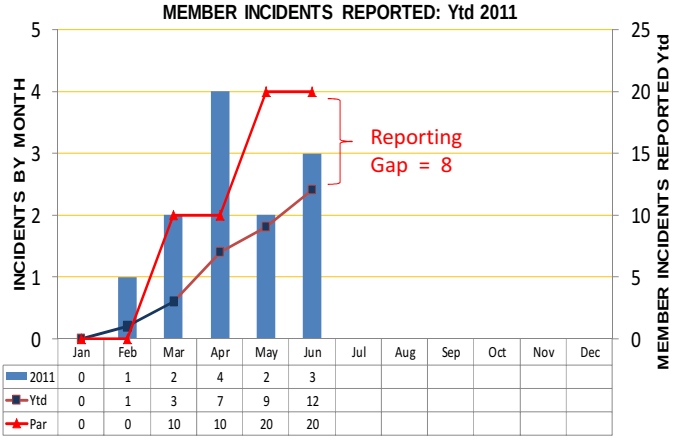


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	2	0	3	5	3	4	8	2	1	2	2	4
2011	0	2	3	4	2	6						
Ytd 10	2	2	5	10	13	17	25	27	28	30	32	35
Ytd 11	0	2	5	9	11	17						

All the incidents reported. This chart compares the total number of incidents (non-member and member) reported to SAFEX every month this year to the previous year. We have reported the same number of incidents so far this year than in 2010. Fewer incidents were reported in 2010. This begs the question: are we having fewer incidents or are we not reporting the incidents we are having? Remember, it's never too late to report an incident.

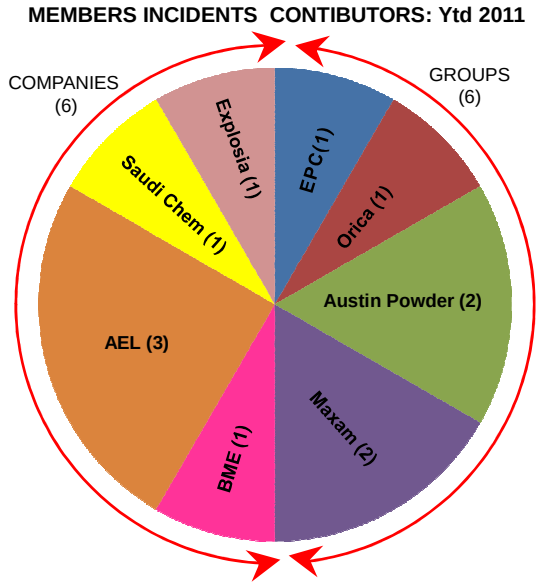
Member incidents reported. Because they give us the best learning opportunities, we track member incidents (MI's) separately in the chart on the right. PAR is an estimate of how many MI's are occurring based on the severity of the MI's that occurred in a particular month. The gap between the number of MI's reported and PAR is our Reporting Gap. The Reporting Gap suggests that only ⅔ of our MI's are being reported.

MEMBER INCIDENTS REPORTED: Ytd 2011



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011	0	1	2	4	2	3						
Ytd	0	1	3	7	9	12						
Par	0	0	10	10	20	20						

MEMBERS INCIDENTS CONTIBUTORS: Ytd 2011



Contributors of member incidents. This chart identifies those members who reported their incidents. It shows the number of incidents each of these members have reported relative to the total number of MI's received. The chart distinguishes between Groups and Companies merely to indicate the performance of the two membership categories. Group Members have about 50% more operating units than Company Members. Year to date 2011 Groups and Companies have reported the same number of incidents.

Know the Expert Panel

The **Expert Panel** comprises individuals who were nominated by members and approved by the Board. Such an individual must be associated with the explosives industry and have acquired expertise in specific fields. He must also be willing to make the same available to SAFEX members on a commercial basis which is agreed between the expert and the member. SAFEX merely "connects" the Expert and the Member who has a need and does not get involved in the detail arrangements.

To access the services of a SAFEX Expert, a client Member accurately defines the need it wishes the Expert to address. This requirement is captured in a Brief which is e-mailed or faxed to the Secretary General. The Member will be notified of the details of Experts that could meet this need. It is then up to the Member to select an Expert and enter into an agreement directly with him.

BILL EVANS

PERSONAL

Position: Global Science Associate

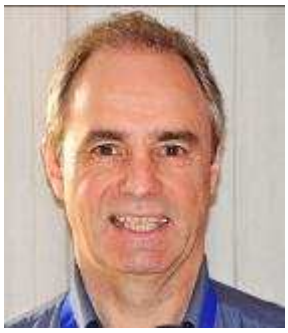
Company: Orica Mining Services

Location: San Diego, CA USA

Education: BSc Chem (Hons) - McGill ;
Graduate Studies – UBC

Affiliations: SAFEX Expert Panel,
Technical Committee CEAEC

Languages: English; French;
Spanish (Poco)



CAREER OUTLINE

With CIL/ICI Explosives:

Research /Development Chemist ;
Explosives Development Manager;
Explosives Technical Manager;
Technical Manager, Automotive,
Aerospace and Chemicals;
Packaged Product Manager.

With Orica Group:

Sr. Explosives Scientist, Americas;
Sr. Hazards & Risk Analyst, Americas
Explosives Expert Team

EXPERTISE

- Safety review of explosives operations and risk management, hazard studies
- Auditing
- Incident investigation
- Technical support
- Training

TYPICAL ASSIGNMENTS

1999 - 2008	Orica Explosives Basic and Advanced Courses
2005 - 2006	Significant Risk Audits: Cuatro Cienegas, Monclova (AN)
2005 - 2007	Due Diligence Audits: Itauna, Hallowell, BST Minden
2001 - 2008	Serious incident investigations – Nova Iguacu (led), Lorena
1999 - 2003	Hazard Study Leader Trainer
2007	Orica Hazards Management Systems training (Denver)
2004 - 2008	Orica EET Plant Audits: Hallowell, Cuatro Cienegas, Gomia, Weihai, Itauna (2), Yarwun, Wurgendorf, Limay, Liddell, Lampa, La Chimba
2006 - 2008	Prepare Basis of Safety for PE Plants, Powersplit, Propellants
2007 - 2008	Hazard Study Leader: new plants Brazil, Chile, Columbia

Feedback from the Boardroom

The SAFEX Board of Governors met during the recent Congress in Istanbul. Uppermost on the Agenda were the issues that had to be discussed at the Ordinary General Meeting of Members the following day. This edition of the Newsletter focuses on some of these issues. The next Board Meeting will take place on Sunday, 12 February 2012 in Nashville, TN USA during the annual ISEE Conference.

2008 to 2011 SAFEX Board of Governors Report

This is a Report in which the Board of Governors reviews SAFEX's activities during the period June 2008 to June 2011 for SAFEX Members. It is also intended to supplement the Meeting Papers for the Ordinary General Meeting of Members that was circulated to SAFEX Members prior to the meeting. Delegates from the SAFEX community received a copy when they registered at Congress. It is also available in PDF format for Members who were not represented at Congress.

The review commences with an overview of SAFEX Membership and the activities of the Board of Governors. After outlining the Organisation responsible for implementing the Board's programmes, the Report gives a brief review of the Member Services provided. This is followed by more information on those Agenda items which were not detailed in the Meeting Papers including the financial position of the Association. SAFEX is still proud to be able to organise its Congresses from the annual subscriptions levied without any additional charge to members. The review concludes with some Acknowledgements.

If any member of the SAFEX community requires a PDF copy of the Board Report please approach the Secretariat at secretariat@safex-international.org .

Jean-Yves Canihac, Stephen Connolly, David Gleason and Karl Maslo indicated that they will be retiring from the Board and are therefore not available for re-election for another term of office.

SAFEX says "Goodbye" and "Thank You" to Retiring Governors

Jean-Yves Canihac

David Gleason

These Governors served SAFEX with dedication and enthusiasm over many years. Their commitment to the health, safety and environmental performance of the explosives industry was obvious to all. SAFEX was fortunate to have had the benefit of their considerable experience to help guide it over many years. It was not surprising, therefore, that the General Meeting enthusiastically endorsed the Chairman's vote of thanks to these Governors for their selfless service to and support of SAFEX.

On behalf of our readers, the SAFEX Newsletter echoes these sentiments and thanks Jean-Yves, Stephen, David and Karl for their loyal support and encouragement. We wish them well in whatever plans they have for the future.

Stephen Connolly

Karl Maslo

SAFEX welcomes the Board of Governors for 2011 to 2014

The Ordinary General Meeting accepted the Nomination Committee's proposals for the SAFEX Board of Governors for the term June 2011 to June 2014. The Nomination Committee was appointed by the Board to conduct the nomination process during which Members were given the opportunity to nominate Governors. The following serving Governors were re-elected to the SAFEX Board of Governors:

Enrique Barraincua (Maxam Corp)
Andy Begg (Individual Associate)
Steven Dawson (Dyno Nobel Asia Pacific)
Rahul Guha (Solar Industries India)
Piet Halliday (AEL Mining Services)
Claude Modoux (Poudrerie d'Aubonne)

The new Governors that were elected are:

Terry Bridgewater (Chemring Group PLC)
Carlos Orlandi (Enaex Servicios S.A.)
John Rathbun (Austin International)
Thierry Rousse (Groupe EPC)
Mark Thomas (Orica Mining Services)

We will be introducing the new Governors to our readers in our Newsletters starting with Terry Bridgewater below. On behalf of all SAFEX Newsletter readers we wish our new Board of Governors every success during their term of office and assure them of our support.

Meet our New Governors

Terry Bridgewater

Terry is a newly appointed member of the Board of Governors and is the Director of Safety for the Chemring Group. Chemring is a fast growing defence contractor specialising in the manufacture of primary and secondary explosives, detonators, munitions, propellants and pyrotechnic devices for military applications. They also have a very successful explosive ordnance device (EOD) detection and destruction business. Chemring has 25 facilities and employs over 4,000 employees.

Terry started his career as a mechanical engineer in the aerospace industry where he progressed and ultimately moved in to project and change management. During this period he became heavily involved in lean implementation, six sigma and business process redesign. One of the projects was to turnaround poor HSE performance including addressing process and competence issues across the group. He enjoyed this so much that he stayed in the Safety Function achieving the position of Director of HSE for Lucas Aerospace, then Goodrich (the US aerospace giant) and then Smiths Group before being approached by Chemring to help bring structure and leadership in safety to the fast growing organisation.

In addition to his responsibilities in SAFEX, Terry is on the safety board for Southampton University, chairs a UK regulator committee on Safety Performance Indicators and is a member of the UK Engineering Employers Federation South East Regional Council. He has a Masters Degree in Contaminated Land Remediation and is a Fellow of the Royal Aeronautical Society.

Most weekends you will find Terry racing his sailing boat with his wife Estelle. If he has time, he enjoys mountain walking, cycling and relaxing to music.

Congress Chat

The XVII SAFEX Congress took place during the week **Monday, 23 May to Saturday, 28 May 2011** in **Istanbul, Turkey.** The main Congress activities comprised the Training Session (Monday and Tuesday); Workgroup Meetings (Wednesday); Chairman's Programme (Thursday); Plenary Sessions (Thursday and Friday); and a Social Programme for Spouses/Partners and Delegates (Thursday, Friday and Saturday). The Plenary Sessions were divided into an Open and Closed Day; participation in the Closed Day being restricted to members of the SAFEX Community.

Senior Executives make valuable inputs at the Chairman's Forum

The Chairman arranged a special Programme for invited senior executives at the Congress. A total of 35 senior executives accepted the invitation and participated in the activity which ran concurrently with Sessions II and III of the Open Day on the Thursday. SAFEX is very grateful to those chief executives who made a special effort to join the Programme. The Programme consisted of the Chairman's Forum followed by the Chairman's Lunch.

During the Forum, which was facilitated by Andy Begg and Dr Piet Halliday, senior executives were asked about their views on the way forward for SAFEX. By all accounts we received valuable insights which will be discussed at th next Board of Governors meeting in Nashville next year.

SAFEX thanks all those who participated in the Chairman's Programme for their commitment to SAFEX and their contribution to planning its future.

Fewer Visitors Impacts Congress Attendance

SAFEX does not play the "numbers game" at Congresses. In other words we do not judge the success of a Congress by the number of delegates. To us there are other more important considerations such as the scope of activities we are able to offer and the content of each of these activities. It is nevertheless interesting to compare the attendance at the 2011 Congress in Istanbul to the previous 2008 Congress in Madrid. The following table provides some comparative statistics about the participation at these Congresses:

STATISTIC	*2011 CONGRESS, ISTANBUL*	*2008 CONGRESS, MADRID*
NUMBER OF DELEGATES		
Members	133	138
Associates and Expert Panel	16	16
Visitors	9	18
TOTAL	**158**	**172**
WHO DO THEY REPRESENT		
Countries	37	36
Group Members	7 (= 100%)	6 (= 100%)
Company Members	38 (= 60%)	44 (= 79%)
DELEGATES PROFILE BY ROLES		
Senior Managers	37%	30%
Functional Managers/Specialists	42%	50%
Line Managers	31%	20%

Number of delegates

As you can see the attendance in Istanbul was slightly down on that in Madrid primarily as result of fewer Visitors. While we invited some 30 visitors to join us in Istanbul, only 9 could accept our invitation. There were two reasons for this:

- The IGUS-EPP and CIE Conferences were unfortunately held earlier in May. As many of our invited visitors had to participate in these conferences it was difficult for them to attend SAFEX as well
- Travel restrictions as result of cut-backs in government spending in the current economic climate prevented some interested visitors from participating.

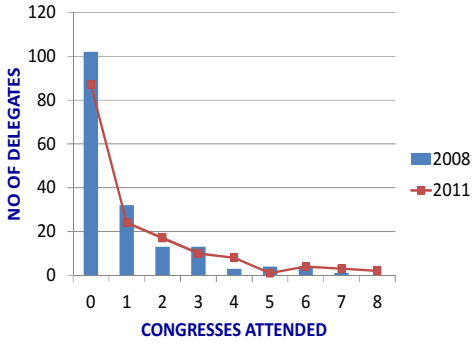
Representation

The other noteworthy feature is the fewer number of Member Companies that participated. While all the Group Members were represented, only 60% of our Members were able to send delegates. This is unfortunate as we would have liked to have seen representatives from at least 80% of our Company Members at the Congress. We can only assume that the current economic climate discouraged more Company Members to send representatives.

Delegates Profiles

We look at the delegates profile in two ways:

- *Organisational roles* delegates perform. We look at the roles in terms of senior managers, functional managers and specialists and line managers. Because SAFEX rates senior management participation at the Congress (even if it is just for one day) so highly, we do everything possible to encourage this. We are therefore delighted that a greater percentage of our delegates in Istanbul (37%) performed this role. We also encourage by the greater participation of line managers (31%). They are responsible for the day to day running of the operation and in a position to influence HSSE performance directly. Functional managers and specialists still form the backbone of our delegates and we are grateful for their continued support.
- *Number of SAFEX Congresses* which delegates had attended. While we will always encourage first time delegates to attend our Congresses, we want to see more delegates participating regularly. Building networks with colleagues who face the same problems as you do, is one of the biggest benefits of any Congress. Our Congresses are no exception. Recurring participation is one way of sustaining and developing such networks. This graph compares the "*Congresses attended*" profile of Istanbul delegates (red line) with those in Madrid (blue bars).



Congress Overview in Pictures

We will be sharing the feedback we obtained from Congress delegates in a future edition of the Newsletter. Readers who were unable to attend the Congress in Istanbul may find some of the following pictures and the commentary associated with them of interest.

Training Session Oversubscribed.

Unfortunately we had to show away some 10 delegates who registered too late for the Training Session. As it was some 40 delegates participated in the training when we originally planned for 30 participants. The Session focused on Basis of Safety and Good Explosives Practices and the participants came from a variety of backgrounds about which we were very pleased. The photograph shows some of the syndicates working on one of the practical exercises during the 2-day event.

Record attendance at Workgroup Meetings

The photograph above shows one of the Workgroup meetings in progress. Six such meetings took place on the Wednesday – three of them ran concurrently in the morning and three in the afternoon. Altogether 79 people participated in these meetings when we originally catered for 50. SAFEX is delighted at the interest shown as the Workgroups will become increasingly important in helping us tackle some specific HSSE issues. The secret to their success will be to maintain the momentum developed at the Congress.

Welcome Reception

This was a scene at the Welcome Reception which signified the official start of the Congress itself. The Welcome Reception gives delegates and their spouses/partners an opportunity of meeting new friends or renewing acquaintances. We expected 185 people at the Reception but fewer people than registered appeared to participate which was a pity.

Plenary Sessions

Coffee breaks during the Plenary Sessions gave delegates an opportunity not only to network but also discuss aspects of the Papers that were presented. A total of 29 Papers were presented during the two days. There was also adequate opportunity to comment on the Papers or ask questions before delegates broke for Coffee at the end of each Session as shown above.

Gala Dinner on the Bosporus

The Gala Dinner on the Friday night is the climax of the Congress. It took place on one of Swisotel boats, *The Istanbul*, which sailed the Bosporus while delegates enjoyed a buffet dinner on board. The Bosporus is the waterway that separates Europe and Asia and was therefore of symbolic significance for SAFEX which prides itself on bringing delegates together from all over the world. The photograph below shows delegates boarding the boat for the Dinner.

The weather did not deter delegates on the Congress Excursion

A whole day excursion was arranged for delegates and their spouses/partners on the Saturday. The highlight of the excursion, which included visits to some of Istanbul's popular tourist attractions, was a cruise on the Bosporus in daytime. It enabled delegates to see the sights on either side of the Bosporus. While the weather on the day was not the best, it did not deter delegates from making the most of the excursion. Lunch was served during the cruise and here a group of delegates are eagerly waiting to be served.

Research Notes from CERL

Difficulties in Carrying out TDG Classification Tests

Dr Phil Lightfoot

Introduction

The UN Manual of Tests and Criteria [1] is widely accepted around the world as a *de facto* standard for classifying dangerous goods for transport. Unfortunately, the precise specification of materials in the tests related to explosives has created difficulties in obtaining the materials in some cases. As a result, it can be difficult to carry out some of the tests in exactly the manner specified in the Manual, leading to uncertainty about the validity of test results in some cases. Although it is stated in the General Introduction to the Manual that "The competent authority has discretion to dispense with certain tests, to vary the details of tests, and to require additional tests when this is justified to obtain a reliable and realistic assessment of the hazard of a product", the Manual can be interpreted as a rigorous standard, especially if the competent authority does not have access to expert technical assistance.

As recently described in this newsletter, IGUS is the International Group of Experts on the Explosion Risks of Unstable Substances [2]. IGUS brings together, from all over the world, experts on the risks of dangerous substances. Full IGUS members are from government and independent research organizations; individuals from industry can and do attend meetings by invitation. The aim of IGUS is to exchange information on the behaviour of unstable substances, with respect to production, handling, storage and transport. IGUS works in support of the international bodies dealing with dangerous goods regulations and Transport of Dangerous Goods (TDG) issues are a regular focus of the annual meetings of the two IGUS sub-groups: Explosives, Propellants and Pyrotechnics (IGUS-EPP) and Energetic and Oxidizing Substances (IGUS-EOS).

In light of the difficulties raised by its members, it was agreed at a meeting of the IGUS-EPP group in Osaka, Japan in 2009 that IGUS would survey its stakeholders to establish the scope of the problem of obtaining materials for TDG testing and to begin to address it. This short article summarizes the results of the survey.

Methodology

A survey was sent out in October 2010 to the IGUS-EPP and IGUS-EOS groups. The two groups comprise around 170 members. The members were asked to circulate further to interested stakeholders in government and industry. A compilation of replies and key results was recirculated in February 2011. The results of the survey were presented at meetings of the IGUS-EOP and IGUS-EPP groups in April and May, 2011 [3, 4]. At the IGUS meetings, it was agreed that the expert from Canada would produce an information paper for consideration at the June, 2011 meeting of the UN Sub-Committee of Experts on the Transport of Dangerous Goods [5] by the sub-committee's Working Group on Explosives.

Results of the Survey

Fifty-two comments were received related to the materials used for tests, from 12 organizations, representing both government and industry. The comments were broken down as follows:

- UN and ANE Gap Test – 15 comments
- Time/pressure Test and HSL Flash Test – 8 comments
- DDT Test – 4 comments
- External Fire Tests – 5(c) and 6(c) – 5 comments
- Koenen Tests (Series 1, 2 and 8) – 1 comment
- 8(a) Thermal Stability – 1 comment
- 8(d) Mod. Vented Pipe – 1 comment
- Dutch Pressure Vessel Test – 1 comment
- F.1 Ballistic Mortar – 1 comment
- O.1 Oxidizing Solids – 1 comment
- O.2 Oxidizing Liquids – 1 comment

In terms of the number of comments, the top five difficulties related to materials were:

- Steel tubes for gap tests (6).
- Primed cambric for time/pressure tests (6)
- Donor charges for gap tests (5)
- Wood for external fire tests (4)
- Shock attenuators for gap tests (3)

In order to illustrate the types of comments received we focus here on the materials for the Gap and Time/pressure Tests. Apart from the External Fire Test, the Gap and Time/pressure Tests were of most concern.

1. Gap Tests

<u>Steel tubes</u>

Test Series 1 and Test Series 2 Gap Tests

> Specifications: cold-drawn, seamless, carbon steel tube, OD 48 ± 2 mm, wall thickness 4.0 ± 0.1 mm.
>
> Questions: the manual specifies cold drawn; is this necessary? Is the narrow specification on the tube thickness really necessary in view of the comparatively loose OD specification?

Test Series 8 Gap Test (ANE)

Specifications: 95 mm outer diameter, 11.1 mm wall thickness ± 10% variations. Material properties: tensile strength = 420 MPa (± 20% variation); elongation (%) = 22 (± 20% variation); Brinell hardness = 125 (± 20% variation).

Questions: Specifying multiple parameters increases the difficulty of finding a matching material. Is it necessary to specify three parameters, especially as these are not specified for the Test Series 1 and Test Series 2 gap tests?

Donor charges

Test Series 1 and Test Series 2 Gap Tests

Specifications: 160 g RDX/wax (95/5) or PETN/TNT (50/50), 50 ± 1 mm in diameter with a density of 1 600 ± 50 kg/m^3 and length of about 50 mm.

Questions: Is it reasonable to substitute plastic explosives (in view of the fact that RDX/wax and PETN/TNT have different explosive properties?

Test Series 8 Gap Test (ANE)

Specifications: 95 mm diameter by 95 mm long, pressed 50/50 PETN/TNT (Pentolite) or 95/5 RDX/wax, density 1 600 kg/ m^3 ± 50 kg/m^3.

Questions: Is it reasonable to substitute cast Pentolite for pressed Pentolite, as the difference between cast and pressed Pentolite is less significant than between Pentolite and RDX/wax, and pressed Pentolite is difficult to source? Similarly, is it reasonable to substitute a plastic explosive such as C-4, for similar reasons?

Attenuators

Test Series 2 Gap Test

Specifications: polymethyl methacrylate (PMMA), diameter 50 ± 1 mm and length 50 ± 1 mm

Test Series 8 Gap Test (ANE)

Specifications: cast polymethyl methacrylate (PMMA) rod, of 95 mm diameter by 70 mm long.

Questions: Cast PMMA rod is difficult to obtain and is not specified for Test Series 2. For the purposes of this test, would extruded PMMA not be acceptable?

2. Time/pressure Test

Primed cambric

Primed cambric is not readily available. Some laboratories have stocks, but it is difficult to obtain new supplies, particularly as the detailed specification for primed cambric is not published.

Electric igniters

Specifications: an electric fusehead of the type commonly used in low-tension detonators.

Questions: the specification is not very clear. For example, what is a low-tension detonator?

Unfortunately, readily available electric igniters vary greatly in strength.

Way Forward

The above examples clearly demonstrate that there are a number of significant difficulties in sourcing certain materials exactly as specified for the tests in the Manual. The paper to the UN Sub-Committee of Experts on the Transport of Dangerous Goods proposed that its Working Group on Explosives be given the task of reviewing in detail the specifications in the Manual for materials used to carry out the different tests relevant to explosives [5]. At the time of writing, the UN Sub -Committee of Experts on the Transport of Dangerous Goods is meeting and the report of the Working Group on Explosives has just been produced [6]. To quote from the report:

> *"The working group agreed that the problem of specifications in the test procedures was real and should be corrected. They also agreed that there could be other problems such as errors in procedure, incorrect use of the examples in the procedures, and a difficulty in identifying the key parameters of the tests…As an interim solution, the working group referred to Section 1.1.2 of the Test Manual that advises that the Competent Authority can and should use its discretion in applying the tests and allowing variations in test materials and procedures described in the Test Manual. The working group also agreed that it should conduct a review of the tests mentioned in Parts I and II of the manual with a view to:*
>
> - *better defining the specifications of the tests,*
> - *better defining the tolerances associated with those specifications, and*
> - *to remove any unnecessary or over-specifications.*
>
> *The review should first be focused on identifying errors and defining key parameters, tolerances and acceptable alternative materials. Additional review may also be necessary to evaluate the appropriateness of the tests and procedural details… Many other members of the working group expressed their willingness to work on this review and the chairman will coordinate these activities."*

Conclusions

From our perspective, the outcome of the exercise is very positive, in that our recommendation has been adopted and it is to be expected that a number of difficulties in applying the Manual will be resolved in the near future. The fact that the review of the manual will be carried out by an international group and coordinated by the chairman of the Working Group on Explosives is very positive, as it will ensure that the needs of the international community will be met. At CERL we look forward to contributing to the review exercise.

We hope that this short article has provided a good example of how industry and government, can work very effectively together through expert groups such as IGUS. In light of their very significant impact on the explosives industry and international trade, it is important that the UN Recommendations on the Transport of Dangerous Goods be based on sound scientific principles, so that the risks associated with the transport of explosives are well understood and can be properly controlled without unduly restricting the movement of material.

References

[1] Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Fifth Revised Edition, United Nations, New York and Geneva, 2009.

[2] "The International Group of Experts on the Explosion Risks of Unstable Substances (IGUS)" SAFEX Newsletter 35, December 2010.

[3] "Difficulties with TDG Tests" P. Lightfoot and R. Bowes, Presentation at IGUS-EPP Meeting, Salt Lake City, Utah, USA, May 3-5, 2011.

[4] "Difficulties with TDG Tests" R. Bowes and P. Lightfoot, Presentation at IGUS-EOS Meeting, Washington, DC, USA, April 27-29, 2011.

[5] UN/SCETDG/39/INF.25 "Difficulties in Carrying out TDG Classification Tests" Sub-Committee of Experts on the Transport of Dangerous Goods, Thirty-ninth session, Geneva, 20–24 June 2011.

[6] UN/SCETDG/39/INF.58 "Report of the Working Group on Explosives" Sub-Committee of Experts on the Transport of Dangerous Goods, Thirty-ninth session, Geneva, 20–24 June 2011

Our Explosives Regulatory World

What happened at the 2011 IGUS-EPP Working Group Meeting and 11th International CIE Conference?

Ken Price

Ken Price was an explosives regulator for 30 years and retired as the CIE of Western Australia in 2001. Since then he is consulting as Riskom International. Its activities include working with and for the United Nations Secretariat in Geneva. Riskom consults to governments and industry on explosives safety in transport, storage and manufacture. Testing as well as the use of explosives and related materials are additional elements of the Riskom portfolio. Ken is the Honorary Secretary of the International Chief Inspectors of Explosives (CIE) Forum. Because of his experience and commitment to SAFEX, Ken was unanimously accepted as an Individual Associate Member of SAFEX at the recent General Meeting in Istanbul

The 11th International Conference of Chief Inspectors of Explosives, in conjunction with the 2011 meeting of IGUS Explosives, Propellants and Pyrotechnics Working Group (EPP) was held in Salt Lake City, Utah in early May. Some of the matters discussed at the conferences that may be of interest to SAFEX members are summarized below.

Risk Analysis Program - IMESAFR

Mr Lon Santis from the Institute of Manufacturers of Explosives (IME) gave delegates an extensive briefing on Version 2.0 of IMESAFR, IME's risk analysis program, due for release in 2012.

The major change from previous versions is a GIS interface to allow much easier data entry. This will allow users to visualize the spatial relationships and validate data. The IME will be seeking information from users to modify the model. IMESAFR v2.0 will support more advanced algorithms and be available in a metric version.

Visualisation of risk will allow various exposures to be shown in colour coded risk levels on a map or aerial photograph. Public traffic routes will be defined on the images and included in the algorithm to allow for curved roads and building distances.

It will allow overpressure contours and Quantity Distance circles to be shown. It will also allow sophisticated debris density calculations to affect distances and take into account things like container corners and low density projection rates to reduce risks.

The data import program will allow building recognition to include different building types to be considered.

Explosives Testing and Classification

The session on this subject was very broad and extended over about half a day. It started with an introduction and background from Dr C Watson, CIE Canada, who chaired the session.

Then Dr D Kennedy from Orica in Australia discussed some of the problematic issues in the 8 series test, starting with the Koenen test.

Originally the test developed by Koenen at BAM used town gas as the heating agent. It was subsequently modified to use LP Gas, which has a much higher thermal output. Now, because the steel in the test vessel rapidly weakens after the vessel heats beyond about 400 °C, the tester has only about 25 sec before the vessel becomes too weak to indicate real pressure changes. Thus, most of the more recent results on the low orifice materials are questionable because they are not measuring the explosive properties as the test vessel weakens and tears.

The presentation continued on the Vented Pipe Tests (VPT). The high heat imparted to the test vessel in the 8 (d) (i) test generates fires from the metal fragments when the vessel explodes. The modified VPT [8 (d) (ii)] generates plumes of toxic materials.

Last year, Orica alone spent $2 million dollars trying to make the 8 (d) test work in a reliable way. In their opinion:

- there is a mismatch between the test and the real transport activity;
- ANE will not sustain combustion;
- it takes an enormous amount of energy to initiate this material;
- the current tests for ANE are of little or no value and do not measure the explosion properties of the materials.

In the general discussion it was suggested that the proposals in the paper would benefit from publication and the associated peer review. Dr Kennedy, while welcoming comment and critical assessment of his arguments, asserted that publication was not practical. It was not possible to present the results of the tests in any meaningful way because of the limitations of most publishing media.

Although there is an opinion that the tests are of no value, the arguments to support their removal from the Manual of Tests and Criteria will need to be resolved in the United Nations forum. Any proposal will need to demonstrate that there is a problem, demonstrate the problem and then perhaps put forward some potential solutions. AEISG can do that, as can IME, FEEM or any Competent Authority.

Other companies represented at the Conference were somewhat more tolerant of the tests and it was clear that there was not unanimous support for removal of the tests. However, it was also fairly clear that Competent Authorities around the world are applying quite some discretion with regard to interpreting the tests.

Changes to IMO stowage regulations

Ben Barrett advised the Conference that IMO is modifying its stowage and storage requirements to reduce the number of stowage categories. One major change is that the need for wood lining is being reconsidered for IMO magazines and cargo transport units.

The IMO Editorial and Technical (E&T) group reported in Annex 12 of report 15/3 that only seven UN Numbers have this stowage type. The working group has concluded that there is no rationalized approach to this assignment. It is possible that wood lining may no longer be required for maritime explosives transport.

The question posed to the Conference is whether or not the wood lining is needed, and if so why only for seven UN numbers. A quantitative analysis has been made showing that non-sparking surfaces do not improve safety.

UK raised the issue of rust on the inside of the container, however it was pointed out that rusty containers are not allowed as there are structural serviceability requirements for Class 1 containers other than Division 1.4 which requires them to be in good condition.

Canada pointed out that plywood has benefits to reduce friction levels. Netherlands and several other delegates advised that the plywood provides thermal protection. The wood is good insulation. After Enschede, some studies showed that 8 minutes are required to set the fibreboard alight in an uninsulated container whereas the wood significantly increased the time before the container contents ignited.

There was no conclusion on whether wood lining was necessary or why it only applies to seven UN numbers.

In-Process Hazard Classification of Materials

Dr E Garn Butcher and Dr Kirt Sasser from Safety Management Services Inc (SMS) presented a paper on how SMS has developed a methodology to classify the hazards from Explosives, Propellants and Pyrotechnic (EPP) materials during manufacturing processes.

The UN transport classification system leads one through a series of questions and tests to classify materials. US ATF and many others have different classification systems for classifying for storage. Both are appropriate for "static" explosives, which are not changing their characteristics.

When explosives are being manufactured, they are in a much more dynamic, complex system, with mixing, grinding, hammering, casting, extruding, pumping etc. The end product classification does not define the in-process classification.

Limitations to current classification systems, coupled with the utilization of other recognized tests has lead SMS to develop a systematic approach to classifying EPP materials for in-process conditions. This approach takes into account in-process EPP composition, physical state, configuration, and confinement effects. This in-process protocol does not replace or modify UN, DOT, BATF, or DoD classification systems for storage or transportation,. It does assists EPP manufacturers with proper facility siting, design of personnel protection equipment, and design of new or modified facilities.

Examples were presented as to how the properties of materials being manufactured change their characteristics during the manufacturing process. One could classify the entire operation as 1.1, however there is a need to minimize distances etc. to optimize usage of resources.

SMS developed a flow chart similar to the UN series that will apply to processes. The tests and assessments result in quantitative results (energy levels, pressures, forces, etc.)

SMS also considers materials that accumulate in the manufacturing process such as wastes, residues, spillages etc. And finally they take into account decommissioning of plants.

During the extensive question time, BAM suggested there could be useful benefits in cooperation between BAM and SMS. BAM uses a European standard system and has had very few accidents. The two organizations are likely to be working on further developments in this area.

Conclusion

The next meeting of CIE and IGUS will be held in Berlin in May 2012. The host will be BAM and the meeting will be held in conjunction with the other IGUS Working Group – Energetic and Oxidising Substances (EOS) to mark the 50th anniversary of IGUS.

IGUS is the International Group of Experts on the Explosion Risks of Unstable Substances. It brings together from all over the world independent experts on the risks of dangerous substances.

Currently, two working groups operate under the umbrella of IGUS:

a. **Energetic and Oxidising Substances (EOS)** considers test methods, classification and safety

aspects related to organic peroxides, self-reactive substances and other energetic substances, fertilisers, ammonium nitrate and oxidisers. Process hazards, particularly in relation to manufacturing. Incidents involving energetic substances.

b. **Explosives, Propellants and Pyrotechnics (EPP)** considers explosive properties, general test methods and thermodynamic ratings, phenomenology of explosions, safety and regulatory aspects related to explosives, pyrotechnics and propellants.

Explosives Eco-talk

The impact explosives and explosives manufacture has on the Environment fall squarely in the SAFEX domain. We are as interested in the experiences members of the SAFEX community (Members, Associates and Expert Panel) have in minimising explosives' environmental impact as we are in safety and health. While most of our explosives incidents concern the safety and health impact, we are eager to learn about the environmental side of our activities. By way of this Feature we want to encourage readers to let us have contributions which create awareness of this facet of our operations as well as assist our industry to behave with environmental sensitivity and responsibility.

Life cycle assessment of a smoke-grenade

Joakim Hägvall and Rolf Tryman

(Swedish Defence Research Agency, FOI, Sweden)

This is the presentation of the results from a three years co-operation project between Sweden and France. The project's purpose has been to investigate whether it is possible to use life cycle methodology to improve the environmental performance of munitions. For this study the smoke munitions Galix 13 F1A was chosen since it exists in both countries inventories.

The Swedish part of this project was to perform life cycle assessments (LCA) of the munitions which would generate critical factors for the munitions environmental performance.

From these factors the French part would make a new munitions design, called Green Galix. Sweden would then evaluate the new design to find out whether there was an improvement in the actual environmental performance.

The assessment shows that the new design has improved the environmental performance by about 50%. This was partly achieved by small material changes and reductions but the bulk of the improvement comes mainly from the general design. The idea of the design is to minimize the environmental impact. This means that the munitions are designed to be taken apart which makes it easier to re-use. This also made it possible to extend the life of the munitions from 8 years to 16 years with minor upgrades.

Introduction

This report presents the work done by the Swedish part in the collaboration project between Sweden (FOI and Swedish Defence Material Administration, FMV) and France (Direction generale de l'armement, DGA, Nexter Munitions and Etienne Lacroix Tous Artifices). The Swedish contribution to this cooperation was Life Cycle Assessments (LCA) studies of the munitions called Galix 13 F1A to find environmental critical factors of the munitions. The French contribution was, on the basis of these factors, to construct new and environmentally improved munitions, with same masking performances (this new munitions is called Green Galix). Sweden would also confirm with LCA studies whether the munitions environmental impact had improved with the new design.

Methods

FOI has performed quantitative LCA´s using the computer program SimaPro 7.0 from PRé (Product ecology consultants), Netherlands.

LCA is the compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout the life cycle. The Life cycle includes mining of raw material, production, use and disposal of a product (i.e. from cradle to grave) (ISO 14040, 1997). The term 'product' includes physical products as well as services. LCA´s are often used for comparative studies. However, it is not the products that are compared, rather the function of the products.

Goal and scope definition

The goals of this study are:

To identify the critical functions in the life cycle which have the largest impact on the environment

To establish that the design changes will improve the environmental impact

To increase the knowledge of Life Cycle Thinking and Ecodesign concerning munitions.

The scope of this study is, within practical limits, to do a quantitative LCA that includes all processes from cradle to grave (except the storage phase) for the Galix 13 F1A and for the new design, Green Galix.

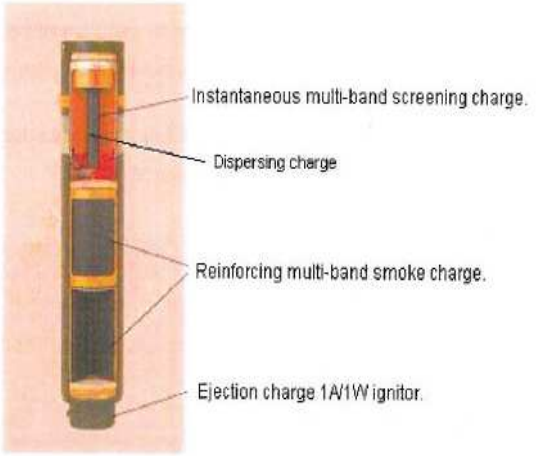
In the study of Galix 13, the material data used originates primarily from the producing country of the raw materials. If data from the producer country were unavailable, data was taken primarily from France and secondly from Sweden. In

the case that there was no available data from those countries, any available data were used. Data were primarily taken from EcoInvent or SimaPro databases. EcoInvent is a database with the same format as the SimaPro database produced by the Swiss Centre for Life Cycle Inventories (www.ecoinvent.ch).

Inventory analysis

Galix 13 is a smoke-grenade designed to protect a vehicle when threatened. It consists of one screening charge (brass) and two smoke charges, see figure below.

A data base was built up with all items and processes used in the production and from the use of the munition All initial data was received from the producer of the munitions (Nexter and Lacroix).



Impact assessment

From the LCA-calculation the four most critical items for Nexter and Lacroix have been identified. These can bee seen below in Table 1 for Nexter and Table 2 for Lacroix.

Table 1: Critical Items for Nexter

No	Critical Item
1	Steel, 1,7 kg low-alloyed
2	E2
3	Steel, 0,676 kg unalloyed
4	Smoke charge casing

Table 2: Critical Items for Lacroix

No	Critical Item
1	Brass
2	AlCuMg (2017)
3	Aluminium (Al99 I)
4	Zinc steel

This has been established by weighting each process contribution to the whole environmental impact. The critical items are listed in the order of importance; number one has the largest impact, number two the second largest and so on.

The most critical item for the whole munitions is from Lacroix, the environmental effect comes from the Brass in the screening charge. In table 1, E2 is an industry confidential item.

Results from the modification

Green Galix

From the aforementioned results both Nexter and Lacroix have made improvements in the design of Galix 13 by simplifying its design and decreasing the amount of metals, where the largest reduction was in the amount of brass by 14% (without any reduction of the performance). Some metal parts have also been changed to recycled metals.

The greatest change of the process was the reuse of parts and manufacturing the munitions so it could be taken apart. In effect these changes make it possible with only small adjustments to increase the lifetime of the munitions at least from 8 years to 16 years. So, instead of manufacturing two munitions items, only one needs to be produced with small complementing parts. This also makes it easier to recycle parts of the munitions when it is no longer possible to prolong the life time.

Comparison Galix 13 F1A and Green Galix under 16 years

The greatest impact is not actually the change of materials but changes in the general approach. The new design gives the benefits of a potential longer life and enables the re-use of munitions parts. These benefits are not clear when only looking at each LCA by itself, but becomes clear in a comparative LCA.

To get a comparison of Galix 13 F1A and Green Galix under 16 years, it is needed to produce two munitions of Galix 13F1A for each munitions of the Green Galix. During these 16 years the Green Galix has to go back to the manufacturer for an smaller upgrade, where the delay part in the brass pot is exchanged. This upgrade will prolong the life cycle for Green Galix to 16 years.

The LCA-calculation shows that the design changes made from Galix 13 to Green Galix reduces the total environmental impact with more than 50%. This reduction is mostly due to the prolongation of the life cycle for Green Galix. The reduction of brass by 14% has great influence as well as the other improvements in Green Galix.

Discussion

When analysing Galix 13 F1A the most prominent impact comes from different metals such as brass, steel and aluminium. Without comparison brass (used as an IR obscurant) has the largest impact on the environment. The second largest is steel but it has a considerably smaller impact than brass. The impact from brass is so extensive that it complicates the analysis because it is difficult to see all the smaller impacts.

When analysing the Green Galix design the impacts are similar to the old design. This is not surprising since the changes in design are only minimal when it comes to the materials used. The largest improvement is the reduction of brass with 14%, without any degeneration in the performance. More use of recycled metals and other smaller reductions gives positive effects. By this the environmental impact reduces with about 10%.

The large change does not come from the exchange of materials but from the exchange of approach. By designing the munitions in a slightly different way it is possible, with minor changes, to extend the life of the munitions from 8 years to 16 years. This gives a significant change in environmental impact. It is seen that the life extension reduces the environmental impact with about 50 % and adding the material changes we have a total reduction of about 50-60%.

In this study, the only end of life considered is the actual use of the munitions. By adding recycling processes it will reduce the impact especially from metals.

It has to be said that the largest environmental improvement that can be done to the Galix 13 is to exchange the brass flakes in the obscurant to another material. It will need an extensive research effort to find a replacement to brass. Even if it would be possible, it is not decisive that the cost of this would actually benefit the environment.

LCA is a very time consuming tool, and in that way a very expensive tool, mostly because of the data collection. Added to this it is also difficult to evaluate the results and there is a part of the evaluation that is subjective to the evaluator's judgement. This limits the use of LCA, but as a first study it gives a good understanding of what is environmentally important in munitions.

What has been found for munitions is that the metal parts have an overwhelming environmental impact. So with a general knowledge about environmental impacts and the information that are gathered in this and similar LCA it is possible to do generic assumptions about the environmental impact for other munitions

A full report can be found at www.foi.se under publications, "Life Cycle Assessment of Galix 13 F1A and Green Galix"

Inbox @ SAFEX-International.org

From time to time we receive e-mails from members of the SAFEX community on a variety of issues. It is important we share such experiences and insights and if necessary debate them. Our quarterly Newsletter may just be the forum to do so.

We therefore invite ALL readers to drop us a line at secretariat@safex-international.org if they want to raise an explosives health, safety or environmental issue or comment on any of the opinions received from our correspondents.

On Fighting a Tyre Fire

A member reported that a truck carrying a container of ammonium nitrate fuel oil (ANFO) explosive, cartridge emulsion and detonating cord incurred a tyre fire on the way to a customer site as result of brake pads overheating. The civil defence organisation who responded to the emergency evacuated the area and allowed the truck with the containers of explosives to burn out.

This report prompted Maurice Bourgeois (GD-OTS Canada) to send us the following comment: Tyre fires are quite an issue. Military standards prescribe that if the cargo is not affected by a fire, the fire should be extinguished with all means available. Firstly, truck drivers should be well trained in fighting fires. Secondly, we should determine how much extinguishing power is required to extinguish a tyre fire – is it one 10 lb ABC fire extinguisher, two or more? A video should be made to show drivers how and when to fight a tyre fire. If it could have been fought safely, it should have been done. In the Walden case obviously it could not be fought and the consequences were dramatic. In this case, I wonder what could have happened if the load did not burn itself out and transitioned into a detonation - all because of a tyre fire that wasn't taken care of when it could have been extinguished safely.

Additional Causes of Forklift Incident Possible

A member's forklift truck was transporting empty reels when one of the reels fell of as the truck hit a bump in the road. When the driver stopped to retrieve the reel, the forklift started moving downhill. While the operator was trying to get onto the forklift to stop it, the front left wheel collided with an obstacle which caused the forklift to roll over. The operator escaped unscathed as the truck rolled away from him. The investigation found that the cause of the incident was non-compliance with the approved procedures for driving forklifts as the operator did not engage the hand brake when he stopped to retrieve the reel.

Mervyn Traut (Expert Panel) suggested: While the non-observance of procedures by not engaging the hand brake was certainly a contributory factor, may I suggest the root cause in this incident is probably: (a) poor maintenance of the roadway; and/or (b) poor stacking/ containment of reels. As regards the operator, all I can say is how lucky can you get?

Lone-working Issue Illustrated.

In a recent incident reported to SAFEX, an operator slipped and threw a can of delay composition powder forward as he fell. The powder ignited when the can hit the floor.

Maurice Bourgeois (GD-OTS Canada) saw the following lesson in this incident: While the worker in this incident may not have been working alone, I believe it is a good illustration of an instance when lone-working should not occur. The operator was dealing with sensitive powders. Someone in close proximity should be aware that he was carrying a sensitive powder to another place and would be returning in a relatively short period of time. This second operator would have heard or seen the incident. Had the first operator been injured, immediate assistance was possible. This also emphasizes the importance of communication between workers working with sensitive explosives.

If the operator had been working on his own and was injured at the beginning of the recall cycle, it could have taken as long as 40 minutes before assistance arrived.

Alternative Explanation for Ammunition Explosion

The following incident which appeared in the media was reported to SAFEX: Some artillery shells were initiated while soldiers were disassembling expired ammunition for disposal. The exploding shells started fires in the surrounding area, including adjacent ammunition storage facilities, and this lead to further explosions. It was suggested that a shell of which the detonator had not been removed caused the incident when it was thrown onto discarded components.

Based on the available information Maurice Bourgeois (GD-OTS Canada) has his doubts about the published cause. He says: I doubt whether a detonator was involved because a detonator will be in the fuse at the HE end of the shell. Therefore, if the detonator had initiated, the shell would have exploded killing the personnel in the area. The problem probably occurred at the propelling end of the ammunition. If a mortar was involved, the ignition cartridge could have ignited when its percussion primer cap hit, for example, the edge of a tail fin in a collection bin. Hence it is important to follow a sequence and make sure that the dangerous elements are removed (e.g. ignition cartridge with impact sensitive primer cap) before discarding the shell in a bin which contains objects with sharp edges that can set-off primer caps.

Another possible cause could have been poor housekeeping. If a shell was dropped on loose propellant on the floor, it could have started a fire very quickly. I hope we will get the results of the investigation, because it is a very interesting case for us.

Comments on Snap, (Slap) and Shoot Incident

While producing shocktube coils for initiating system units, the off-reeler failed to stop and the tube overwound. When the equipment started up again the excess tube became entangled in the coiler, snapped and then initiated. Oil was applied to the brake pads of the off-reeler without authorisation and this caused the overwinding. The brake pads were oiled in an attempt to increase the length of the coils.

Maurice Bourgeois (GD-OTS Canada) sent us the following observation: Here we have a typical case of a Management of Change flaw. Oil was put on the brakes to increase the length of the reel. The operator did not consider the consequence of tampering with an essential element of the reeling system. The change was not justified because the root cause of the problem was not addressed

Lon Santis (IME) made another valuable comment: Unless SAFEX is aware of a hazard we are not, I have a suggestion based on some misunderstandings that occurred with these types of incidents in the past. In our experience, these incidents have three components: the snap, a slap, and then the shoot. We refer to them as snap, slap and shoots. If SAFEX has info that a slap is not needed to get an initiation, we'd really appreciate it.

We will love to hear from readers about their experiences with "snap, (slap) and shoots". Are you aware of any research into the "snap, (slap) and shoot" mechanism? If so, please share it with us.

Pondering the Profession

The so-called 'Safety Professional' is an important element in the explosive industry's health, safety and environment efforts. If that is the case, we should be devoting a column to our Safety Professionals and create a forum in which we can talk about the Profession. We have referred to it as "so-called" because as we well know the work of the Safety Professional goes further than safety and often includes health, the environment and sometimes security as well. The Board of Certified Safety Professionals (BCSP) puts it this way: "*Today's safety professionals are well-educated, highly-motivated and aim to recognize, evaluate, and control risks to people, property and the environment. They must be able to apply technology and work with top management to minimize risk and ensure that safety, health and environmental performance are fundamental measures of business success.*" Our aim is that this column will be read by all but that the Safety Professionals in our industry will make it their own.

Defining the Safety Function in Explosives

After chatting to a Safety Professional recently, it seems some debate about the following questions may be appropriate:

- What is the role of the Safety Function in an organisation?
- To whom should the Safety Function report in the organisation?
- How should the Safety Function be structured?

In an attempt to get the ball rolling may we publish the thoughts we picked up in a very preliminary and superficial survey of some Safety Professionals.

1. **The role of the Safety Function**.

Our respondents indicate that the Safety Function can be expected to perform the following activities - in no particular order:

a. It serves as an extra set of eyes and ears for the Line Manager on the shop floor – but is not a substitute for the line manager being on the floor him/herself.
b. Makes sure that the management system, which the Line should own, is working.
c. Measures progress of the management system using relevant metrics. Assists in the analysis of these metrics - e.g. Pareto trends.
d. Assists in developing and delivering HSE training.
e. Participates in incident investigations.
f. Coordinates safety audits and monitors the quality of the audits which are done by the Line.
g. Provides professional advice on safety programmes and activities.
h. Involved in the selection and development of Safety Professionals.
i. Interacts with government HSE officials.

j. Manages the documentation for the HSE management system and other administrative duties.

2. To whom should the Safety Function report?

The following principles should be considered according to our respondents:

a. It should report as high up in the relevant entity (company, factory, plant, etc.) as possible. The person to whom the relevant Safety Professional reports, reflects where the ownership of safety lies in that entity and how important the entity regards safety. This is a philosophical issue. HSE professionals should not be forced into a line reporting relationship unless there is consensus among senior management that safety is a line function within the company. Many line managers are uncomfortable at first with such an arrangement. Therefore, it may require supplemental training and education of the line manager before he can use the Safety Function optimally in such an arrangement.

b. It should report to a line manager (as opposed to another staff function) otherwise the Line does not own the management system. Line managers are the most important people in safety because they have line authority to change or affect the critical factors affecting poor safety performance e.g. unsafe behaviour, hiring, discipline, termination, adherence to site policy and procedure, process change, purchasing, having and adhering to engineering standards, pressure meet financaial expectations at all costs, complying with HSE regulations and legislation, etc. In other words, safety is a line function. However, line managers can't possibly do everything necessary to manage safety at a high level so that is what the role of the safety professional is – to help line management.

c. The type of person appointed as the Safety Professional must be able to act as an effective partner to the line manager. Besides his abilities as a safety professional [technical knowledge, good vision (can see risk – unsafe behaviour, process and conditions)], the person must be able to relate to both business and technical aspects of the organisation. In the Executive Team's discussions on business issues, he must be able to act as the "safety conscience" that highlights the relevant safety implications of any decisions made.

d. Delineation of the line manager and Safety Professionals roles must be clear. The line manager must know how to use the Safety Professional to best effect.

3. **How should the Safety Function be structured**?

This depends on the organisation and its safety culture. When a separate Safety Function is new in an organisation:

a. There tends to be more Safety Professionals throughout the different organisational levels. In North. America this is typically 1 Safety Professional for every 50 to 200 employees in high risk industries e.g. explosives, petroleum refining, steel mills, etc. As the organisation matures in its safety culture and the line assumes more responsibility, the number reduces to 1 Safety Professional for 300 to 500 or more employees.

b. It is more centralised. The Safety Professionals at all levels report directly to the senior Safety Professional. With maturity and recognition by the line managers at different organisational levels of the Safety Professional's role, the Safety Professional can report directly to the line manager concerned and indirectly to the senior Safety Professional. This type of matrix relationship ensures that line management adheres to the company's HSE strategic plan, while allowing them the autonomy within that plan to manage as they see fit. Responsibility without proper resources and some degree of decision-making and autonomy will more than likely result in frustration and lack of personal ownership among line managers.

c. In companies large enough to have division or corporate staff, maintain as small a foot print with division or corporate HSE staff as possible. Disseminate HSE staff into the business units where they can do the most good – reporting to line management. Division and corporate HSE specialists depend on the size and complexity of the company. They can be occupational hygienists, ergonomists, process safety engineers, physicians, audit program managers, etc. If their knowledge and service are only needed periodically, outsource the function and use consultants and contractors to minimize headcount and overhead costs.

These are some of the thoughts we encountered in our brief survey. SAFEX would like to get the reaction to these questions from other Safety Professionals and line managers in our industry. Please let the Secretariat have your thoughts and we will gladly incorporate them. By capturing the experiences of SAFEX Members regarding these issues, we can help others establish or optimise their Safety Function.

Make this column your own!

Safety Snippets

2nd Conference on Explosive Education and Certification of Skills

SAFEX has been advised that the 2nd Conference on Explosive Education and Certification of Skills will be held in Hotel Açores Lisboa in Lisbon on 21 September 2011. The conference hopes to contribute to the harmonization of training and qualification of personnel in the explosives sector. The organisers also have the development of a transferable certificate of Explosive Competences in mind. The conference addresses all people occupied and active in the sector of explosives (explosives, propellants and pyrotechnics) from Governmental Agencies, Education Institutions, Employers and Employees Societies, Public and Private Companies in Military and Civil areas.

Main topics of the Conference include: Education and vocational training in explosives sector; Legislation on qualifications and certification competencies in explosives sector;

Evaluation and assessment of competence development; Health & Safety programs in explosives sector; Applications of information and communication technologies in education and training; and Understanding stakeholders' roles in explosives sector.

Risk assessment in the explosives industry; accident investigation in explosives industry; and the life-cycle of munitions and explosives and recovery are additional topics that will be covered.

PARARI 2011 scheduled for November

Jenny-May Rendell (jennymay.rendell@defence.gov.au) is the Coordinator PARARI 2011 and advised us that PARARI 2011 will take place in November in Brisbane, Queensland, Australia. It is an Explosive Ordnance Symposium that will be jointly hosted by Thales Australia and the Directorate of Ordnance Safety. The following extract from the PARARI Registration Brochure may give those readers who are interested the necessary contact information.

Tony's Tale-piece

A tailpiece is something that appears at the end of a publication. I guess it is derived from the tail of an animal which is (normally) fixed to "the end" of it. However, we refer to this feature as a "Tale-piece". It is not a spelling mistake but a different tale. This "tale" is about telling stories. While it appears at the end of our Newsletter, it is also meant to tell a story hence the play on words. Let me tell you what "Tony's Tale-piece" is about.

Tony Rowe from AEL Mining Services has kindly agreed to provide a regular feature based on truths he has discovered over many years in his work with explosives. He has a unique style of writing (perhaps "telling stories" may be a better way to describe it) which we hope gets a well-known message across in a new way. This Feature is there to remind readers of some explosive(s) truths in a different way!

Who remembers igniter cords – and their hazards?

Tony Rowe

I don't know if I've ever told you before, but I have a corner office. It is not much coveted as it is located on the south eastern corner of the main building and in this part of the world it is not a good thing. To tell the truth, it's not really an office, just the end of the original passage that with the provision of a drywall and an old doorframe was turned into one. It is no bigger than anyone else's, but for some reason has two large windows instead of only one. Sunlight barely

trickles in because the venetian blinds (louvres) covering the windows are always closed. Even during the brighter summer months it is just possible to tell day from night; so it is cool even in January.

In the winter months the presence of that extra window brings with it a penalty of a truly frosty cold. It is so bad that on some winter mornings my toes and fingers sometimes don't work for hours at a time. That's what I tell the boss anyway. The corners of the windows are decorated with a graceful tapestry of delicate cobwebs, but their original builders have long since frozen to death. Of course the office has its very own heater. Once it was probably black and filled with paraffin. There would be a little catch-thing about two thirds of the way down. When pressed the top section would open up to reveal a wick. To operate such a device, you would simply turn up the wick and light it with a match. It would ignite easily, burning with a smoky yellow flame. But here's the trick: when you close the top again the flame turned blue to match your ice cold fingers.

This is no longer the case, I'm afraid. Today there is only the always-present air conditioner. I can see it now looking down at me. It has a superior air about it somehow; sterile white plastic and little LED's. It lurks up there, sitting high on the wall out of reach of inquisitive fingers. Sure, it provides cooling in the summer and heat in the winter. I don't know where it finds the different types of air, but credit where credit is due, it works. It is controlled by a little box-shaped thing with buttons, but it has no soul. There is no cosy paraffin smell; no comforting red glow reflecting from the frost-whitened walls. My breath though will continue to freeze and icicles will form on my facial hair for some time yet to come, but again, as is usual with us older folk, along with our haemorrhoids we also suffer from verbal diarrhoea.

What I would like to talk about today is that old mining favourite: igniter cord.

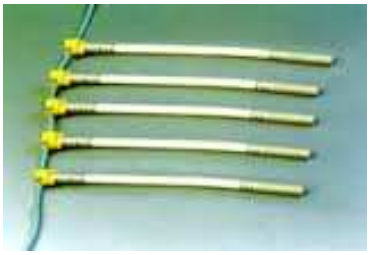
Hey, wait a minute. Did you know that the South African version of igniter cord was developed during the 1950's. Amazingly, it is still in use today. That's not bad for a product that by any account is an antique. They call me a geriatric, amongst other things, but even my car is not that old.

A spool of igniter cord

When I was just a boy, miners working in underground stopes lit fuses using a Cheesa stick (for you young ones, this is a fuse igniter that looked like a pencil!). But by the time I reached secondary school they were connecting up blasts using a new and revolutionary product called "Connector Capped Fuse and Igniter Cord". Wow! Sequential firing was all the rage along with Bill Hailey and the Comets version of "Rock around the Clock". Times they were certainly a'changin'.

Connector capped fuse

The next time you go underground in one of the more established mines take a moment or two to reflect. Remember that the shaft you are going down in right now was probably blasted with safety fuse. The fuses were probably cut and prepared on site and a plain, possibly a Briska detonator was attached and crimped on - by hand - using crimping pliers. As you leave the cage, all those miles of tunnels available to you were also blasted with hand-cut and hand-crimped detonators firing cartridged nitroglycerine based explosives. Somewhere in the many kilometres of tunnels the transition to connector capped fuse took place. It wasn't recorded. There was no trumpet fanfare or troops of dancing girls doing the coco-pan. Life underground simply got safer and perhaps even a little quicker.



An igniter cord capped fuse assembly

In use, connector/capped fuse and ignite cord was simplicity itself. It still is. There were mistakes of course and miners still paid the penalty, but blasting had become safer and easier than it had ever been before. By the early 1960's manufacturer-assembled capped fuses were becoming commonplace and experiments were undertaken to determine how best to store them to prevent their mass propagation in the event of an accidental ignition. Wet spun fuses and the problems of sequential firing within what would soon be called "the concentrated mining technique" were still in their infancy and the problems associated with the use of ammonium nitrate blasting agents were only just beginning to emerge.

Igniter cord wasn't perfect either. Like safety fuse, burning rates were measured in seconds per foot so calculating their modern equivalents is challenging. The early cords didn't tolerate water too well and their burning rates were perhaps not ideal. Twin cords soon appeared, so did connector /cord interface problems. Over time, Guttapercha covered fuses gave way to bitumen overlaid with cotton. This development was followed by the addition of an extra internal layer of a primitive wax-like polymer called WRM19. Today, safety fuses are waterproofed using a single external coating of plastic. They are coloured for identification, cut to length and connectors, collars and different strengths of detonators including cartridge clips, if required by the customer, are attached at the factory. Safety fuses possessing two distinctly dissimilar burning speeds are also readily available. Safety fuses have clearly evolved, but what about their associated igniter-cords?

In South Africa most igniter cords still use the original high thermal conductivity copper wire technology as developed in the "heady days" of the 1950's and 60's. Complex cords have all but disappeared. Although igniter cords are still coated with a water-resistant plastic sheathing, it is for identification purposes only as the compositions themselves are inherently waterproof.

Igniter cords though have a darker side. To cope with the rigors of underground mining they must continue to burn under all conditions of use. They do too. They burn underwater, they burn even if completely buried in sand. Once lit they are difficult to put out. Water won't help and neither will a fire extinguisher. Burning igniter cords provide their own source of oxygen you see.

Igniter cords in bulk – and by bulk I mean anything more than a few metres on a spool, if ignited will burn rapidly and violently, a 100 m spool being completely consumed in just a few seconds. This behaviour may not be apparent to workers who have only seen igniter cord burning when unspooled and laid out in straight lines, as applied in practice. This apparently benign and ubiquitous product has both teeth and claws and can bite, rip and tear when aroused.

Both single spools and cases of igniter cord should be stored appropriately. Full or partly filled spools shouldn't be left lying around or be tossed into out of the way places. Cases should be kept closed and workers having access to the product must be properly schooled in the effects of a mass ignition event. Smoking in the vicinity of any igniter cord, no matter how small the amount of cord, must be absolutely forbidden. Used correctly igniter cord is a safe, robust and reliable product. When handled inappropriately perhaps by untrained personnel or by workers unaware of its properties, igniter cords can cause death and injury.

Stay safe. You know it makes sense.

We Leave You with this Thought

One's philosophy is not best expressed in words; it's expressed in the choices one makes. In the long run we shape our lives and we shape ourselves. The process never ends until we die. And the choices we make are ultimately our responsibility.

~Eleanor Roosevelt

Boet Coetzee

Boet Coetzee
Secretary General, SAFEX International

IS NO ACCIDENT

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REGISTERED OFFICE

SAFEX International
c/o Modoux Services Sárl
Route du Village 13
CH – 1807 BLONAY. Switzerland
Web: www.safex-international.org

CONTACT US

Secretary General
Tel: + 1 919 342 5848
Tel/Fax: + 27 21 854 4962
e-mail: secretariat@safex-international.org