

Lecture PA10

Safety in the European Propellant Industry

H Reich

1. HISTORICAL BACKGROUND

The European Association for Study of Safety Problems in Production and Use of Propellants was founded in 1975 by 5 leading European propellant manufacturers. There were several reasons for the foundation of such an Association. First, there was an increasing demand for high performance propellants on the national as well as on the international markets. Most of the production facilities at this time dated back to World War 2 or were even older. The increased demand could easily be met for quantity but not quality or safety. Some major accidents occurred during this period, and propellant manufacturers all over Europe were looking for new technologies to meet the higher standards being demanded concerning quality and especially safety. In addition, international and especially the European Community legislation concerning the manufacture, transport, use and disposal of chemicals became more and more stringent and its impact on the explosives and propellant industry was rather difficult to judge. In this situation and taking into account that most of the propellant manufacturers had no national partners with whom to approach these problems it seemed quite reasonable to establish some form of international cooperation. Therefore, - as mentioned above - in autumn 1975 EASSP was founded as an Association under French Law by 5 leading European propellant manufacturers. At the beginning full membership was restricted to companies from member countries of the European Economic Community, and companies originating from the European Free Trade Association could only become associated members. However, this restriction was abandoned later on and today every company having its legal seat within the European Union or the European Free Trade Association may become an ordinary member of the Association. Propellant manufacturers from outside this area and even from overseas have the possibility to join EASSP as associated members. In addition, right from the beginning not only companies involved directly in the manufacture of propellants but also with close connections to these activities - e.g. specialised engineering firms - could become members.

Starting with 5 members back in 1975 the Association grew constantly and reached a peak membership of 14 in the mid-eighties with almost all European propellant manufacturers under its umbrella. In the last years membership diminished a little bit to 11 due to the merging of companies all over Europe. This process may go on in the future, but this should not influence the continuation of the activities of EASSP as the worldwide sole non-profit organisation covering all aspects of safety in the propellant industry.

2. MAIN OBJECTIVES AND ORGANISATION OF EASSP

The objectives of EASSP are given in its Articles of Constitution and have remained unchanged since the foundation of the Association. They may be summarised as follows:

The main objectives are to promote the interchange of information and experience between its members in all matters affecting the environment, safety and health of those engaged in the manufacture, transport, storage, use and disposal of propellants, and to foster links with international bodies and organisations having the same goals and interests, including those involved in national and international legislation. Having in mind that the

members of the Association were competitors on the market it was - at least at the beginning - not easy to reach these objectives. A first requirement was the creation of a sound organisation to provide an institutionalised exchange of information between the member companies and to set up working groups to handle the chosen subjects concerning safety.

The actual organisation of EASSP - which has changed little over the past years - is given in Figure 1:

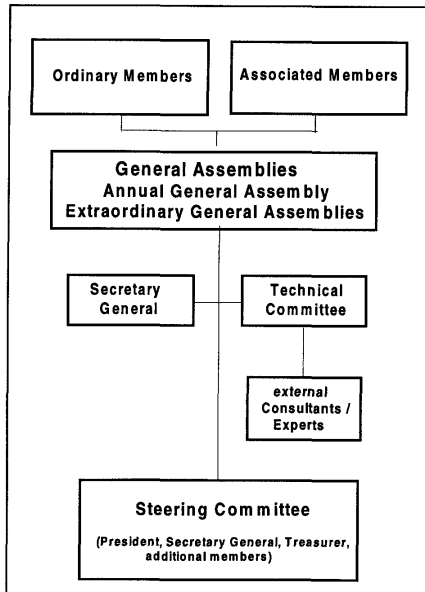


Figure 1: Organisation of EASSP

The main and central body of the Association are the General Assemblies where all members are represented with one vote. However, associated members have no vote in matters concerning the Articles of Constitution and the corresponding Bye-laws. The Annual General Assembly normally convenes once a year at the end of June and deals with all matters of principle concerning the Association, i.e.

- acceptance and election of new ordinary and associated members
- election of the President, the Secretary General, the Treasurer as well as of the Chairman of the Technical Committee
- election of the Steering Committee members
- approval of the Annual Reports of the President, the Secretary General and the Chairman of the Technical Committee
- verification and approval of the accounts for the past financial period
- approval of the budget presented by the Treasurer and setting the yearly membership fees
- formulation of guidelines for the activities of the Technical Committee and other working groups

For the adaptation of the Articles of Constitution and their Bye-laws as well as for the merger, association or affiliation with other organisations an Extraordinary General Assembly must be called and its decision may only be adopted by a majority of two-thirds of the members present.

The Steering Committee consists of the President, the Secretary General, the Treasurer and if necessary of additional members as elected by the Annual General Assembly. The Steering Committee is responsible for the day-to-day conduct of the affairs of the Association, the supervision and control of the activities of the Technical Committee and other Working Groups, the proper distribution of information to the members and the preparation of reports to the General Assemblies. The Committee meets, according to needs, normally once or twice per year.

The officers of the association are the President, the Secretary General and the Treasurer:

- The President represents EASSP in dealings with external agencies and organisations. He ensures the accordance of the activities of the Association with the Constitution, the Bye-laws, other rules and regulations as well as resolutions and motions taken by the General Assemblies. The President is elected for a period of two years and must then be replaced by a candidate from another member company.
- The Treasurer has to ensure the proper current financial functioning of the Association and represents it in all dealings with banks and other financial institutions. He presents the accounts for the past financial year to the Annual General Assembly and proposes - based on the established budget - the annual fees payable by the members for the coming financial period.
- The Secretary General ensures the proper current administrative functioning of the Association and represents it for all civil and/or judicial acts. He assists the President in representing the Association in its dealing with external agencies and organisations. The Secretary General is responsible for the formal organisation of all assemblies and meetings, i.e. invitations, preparation of the agenda, taking, distributing and keeping of the minutes. He submits for the approval of the General Assembly all projects concerning
 - enquiries and/or research
 - the institution of working groups
 - the establishing of external contacts which seem to be useful
 - the obtaining of assistance by external experts and consultants
- He executes all the decisions taken by the General Assemblies and by the Steering Committee. It is also one of his very important tasks to follow up on the development of international and national legislation which may influence the propellant industry. The Secretary General regularly informs the members on these issues. In urgent cases he takes the necessary actions to secure the interests of the Association.
- The Secretary General supervises the activities of the Technical Committee and its working groups. He attends the corresponding meetings and ensures that the Technical Committee works according to the guidelines established by the General Assemblies and the Steering Committee. The Secretary General coordinates the flow of information concerning accidents and incidents. He is also responsible for preparing the final drafts and the publication of all documents established by the Technical Committee or other bodies of the Association.

The last but very important organisational unit of the Association is the Technical Committee. All members must be represented on this committee and companies with more than one principal production site may have additional representatives to ensure that all aspects of their activities are covered. The Technical Committee normally meets twice a year for two days at one of the members' premises. This enables the Committee

to visit the production facilities of the host company and to get to know new installations and technologies. However, it was quite difficult to establish this procedure as it presupposes a rather high degree of confidence concerning the released information.

The principal tasks of the Technical Committee may be summarized as follows:

- to review and report on accidents and incidents occurring within the member organisations as well as within the propellant industry as a whole. Analysing these events and preparing advice on safety for circulation to the members through the Secretary General.
- to investigate and advise on problems affecting the environment, safety and health of those engaged in the production, storage, handling, transport, use and disposal of propellants and their ingredients.
- to consider and evaluate safety procedures and safety systems in production, storage, handling, transport, use and disposal of propellants.
- to prepare Codes of Good Practice and Guidelines on safety in production, storage, handling, transport, use and disposal of propellants and their ingredients.
- to judge the technical and other aspects and implications of International and National legislation and regulations on the propellant industry.
- to deal with problems of testing and classification of propellants.
- to draw the attention of the Steering Committee to matters of concern in the technical and safety field, so that the Steering Committee may decide on the necessary course of action.
- to monitor the issues and cooperate on request with technical working groups of associated and affiliated organisations, (e.g. FEEM, UN Groups of Experts).

In addition to the internal organisation presented earlier EASSP is embedded into a rather extensive external network. (Figure 2):

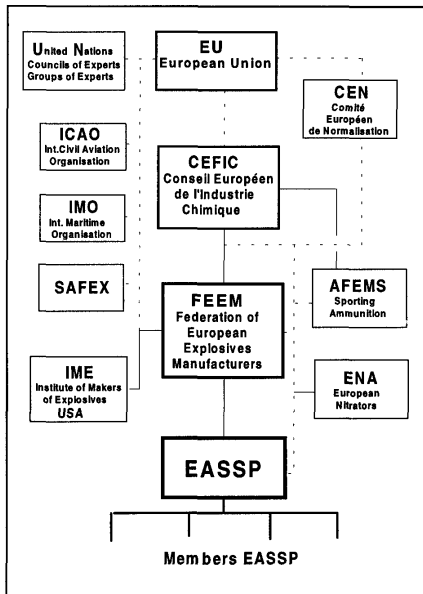


Figure 2: External Network of EASSP

Most of these contacts run through the Federation of European Explosives Manufacturers to which EASSP is affiliated. However, these external contacts shall not be further discussed here.

3. ACTUAL ACTIVITIES OF EASSP

The actual activities of the Association and especially its Technical Committee are all in support of its principal tasks as mentioned previously.

Work is in progress constantly to improve the system for the reporting and evaluation of accidents and incidents. The occurrence reporting form was revised recently and studies were undertaken to establish a data base containing all accidents with propellants. Nowadays the information on accidents and incidents within the member organisation is no longer restricted to incidents where propellants are involved but covers all industrial activities.

In addition, a project was started for the reporting and the exchange of information on near misses. This issue proved to be rather difficult as most of our members had only recently started to establish sound procedures for the reporting of near misses. Therefore, exchange of information on this subject is of prime importance to our members.

The lessons learned from the evaluation of accidents and incidents are directly incorporated into the establishment of Codes of Good Practice as part of the continuing effort to further improve the safety in production and use of propellants. However, it must be mentioned that these codes do not replace the rather extensive National and International regulations but are an additional tool to ensure safe working procedures. During the last seven years 16 codes were published covering the subjects

- storage of finished products
- manufacturing operations for all different kinds of propellants
- decontamination, dismantling and upgrading of installations and equipment

Actually, work is currently in progress on two codes dealing with the storage, handling and recovery of acids and solvents in the manufacture of propellant ingredients.

A complete list of all EASSP publications is given as an appendix to the present paper.

Other current activities are:

- the formulation of a guideline concerning the use of electronic devices - especially mobile phones - inside plants,
- the establishment of a data base on personal protective equipment used by the member companies, including their experience and the available procurement sources,
- and last but not least the active cooperation of our Association in Working Group 5 of the CEN-Technical Committee 321 for the establishment of European Standards for Propellants.

4. STATISTICS CONCERNING ACCIDENTS IN THE PROPELLANT INDUSTRY AND LESSONS LEARNED

Table 1 shows some statistics concerning accidents and incidents in the EASSP member companies over the last ten years.

Year	Number of Accidents / Incidents with Propellants	Injuries	Fatalities
1991	23	11	-
1992	33	13	1
1993	26	21	-
1994	34	25	-
1995	31	23	-
1996	36	25	-
1997	29	17	-
1998	34	16	-
1999	30	19	-
2000	28	18	-
Average	30.4	18.8	0.1

Table 1: Accidents/Incidents within EASSP for the years 1991-2000

One highlight of this statistics is that there was only one fatality during this period. On the other hand, the number of accidents / incidents as well as the number of injured operators remained more or less constant, i.e. an average of approx. 30 incidents with approx. 19 injuries per year. A first conclusion could therefore be that little progress was achieved to improve safety. However, the given figures mean relatively little without additional detailed information on these occurrences. If these details are taken into consideration it becomes clear that the severity of the accidents has decreased substantially, injuries have become less serious and loss of working hours has diminished. (As these analyses are partially based on company-confidential data which include information concerning production quantities and capacities they may not be disclosed in detail). The main reasons for this positive development are certainly the introduction of new, more sophisticated safety systems as well as the use of improved personal protective equipment for the operators.

The lessons to be learned by analysing the EASSP accident statistics over the last ten years can be summarised as follows:

- Working with high energetic materials always implies the risk of incidents, therefore
 - the quantity of material within the production equipment should be kept as small as possible
- and

- whenever feasible, operators should be completely separated from the processing of energetic materials; in other words: remote controlled installations should be used.
- If a complete separation of energetic material and operator is not possible - e.g. by using older installations - the production lines should be equipped with sound safety systems as for example very fast reacting fire detection and deluge systems, rupture discs etc. and the operators should be given the best personal protective equipment available.

To put these findings into practice - especially the one concerning separation of operators and material - means high financial investments and may normally only be done in the course of complete plant replacements. However, such modernisation programmes are difficult to realise in a decreasing market. Nevertheless, some of the EASSP member companies went into the direction outlined and, for example, a completely remote-controlled production facility for single-base propellants became operational last year in Switzerland. In this case not only the envisaged safety goals were reached completely but also quality could be enhanced and impact on the environment was reduced substantially.

As an overall conclusion it may be stipulated that the activities of EASSP over the last 25 years - especially the constant exchange of information and experience between its members - have been very successful and have made a major contribution to the improvement of safety in the European propellant industry.

PA10 – APPENDIX I :

CODES OF GOOD PRACTICE and OTHER DOCUMENTS PUBLISHED BY EASSP

1992	Storage of finished propellants of hazard division 1.3C in internal magazines	Publication 1/1992
1995	Propellant Manufacturing Operations, Part 4: Pressing	Publication 1/1995
	Propellant Manufacturing Operations, Part 6: Rolling	Publication 2/1995
	Propellant Manufacturing Operations, Part 1A: Deacidification/Dewatering of Nitrocellulose	Publication 3/1995
	Propellant Manufacturing Operations, Part 1B: Dehydration of Nitrocellulose by Centrifuges	Publication 4/1995
	Propellant Manufacturing Operations, Part 1C: Dehydration of Nitrocellulose by Press	Publication 5/1995
	Safety Measures on the Management Level (Proceedings of the Munich Symposium)	Publication 6/1995*
1996	Propellant Manufacturing Operations, Part 2: Nitrocellulose/Nitroglycerine Paste Production	Publication 1/1996
	Propellant Manufacturing Operations, Part 3: Mixing/Kneading of Nitrocellulose based Propellants	Publication 2/1996
1997	Propellant Manufacturing Operations, Part 5: Cutting	Publication 1/1997
	Propellant Manufacturing Operations, Part 7: Drying	Publication 2/1997
	Propellant Manufacturing Operations, Part 8: Coating	Publication 3/1997
1998	Propellant Manufacturing Operations, Part 9: Blending/Sieving	Publication 1/1998
	Propellant Manufacturing Operations, Part 10: Handling & Internal Transport	Publication 2/1998
1999	Propellant Manufacturing Operations, Part 11: Waste Disposal	Publication 1/1999
2000	Decontamination, Dismantling and Upgrading of Installations and Equipment	Publication 1/2000
2000	Composite Propellant Manufacturing Operations	Publication 2/2000
2001	Storage and Handling of Acids used in the Manufacture of Propellant Ingredients	Publication 1/2001
2002ff	Storage and Handling and Recovery of Solvents used in the Manufacture of Propellant Ingredients	in preparation

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