

## **Newsletter No. 42**

### **Web Edition**

**June 2010**

*Melanie Thom – Newsletter Editor ([MelanieAThom@cs.com](mailto:MelanieAThom@cs.com))*

The International Association for Stability, Handling and Use of Liquid Fuels, IASH, was founded in 1986. The purposes of the Association are to promote research and experimentation on the scientific and operational factors that affect the stability and handling of liquid fuels during their manufacture, blending, transportation, storage and use; and to provide a forum for the exchange of related ideas and information. Liquid fuels include crude oil and its refined products; products derived or processed from oil shale, tar sands, coal and natural gas; and reformulated fuels such as those containing oxygenated components.

To accomplish its purposes and to promote a better understanding of the problems associated with the stability and handling of liquid fuels, IASH publishes a biannual newsletter, sponsors international conferences and publishes their proceedings. The Newsletter provides members with a medium for publishing notes on research in progress, discussing a problem that has been encountered with the stability and/or handling of a fuel, or commenting on some related technical issue of a general interest. IASH is an international, non-governmental, interdisciplinary, volunteer association. Membership is open to all individuals and organizations subscribing to its purposes.

Further information pertaining to IASH, including membership and availability of past conference proceedings, is available from the secretariat:

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## **A Note from the Chairman**

*By Robert E. Morris, US Naval Research Laboratory*

I would like to begin by thanking Graham Hill for his years of service to IASH. He began his service six years ago when he became 2<sup>nd</sup> Vice Chairman from 2004 through 2005. He then served as 1<sup>st</sup> Vice Chairman from 2006 through 2007, and finally as Chairman from 2008 through 2009. For someone who was running a small consulting company, it was remarkable that he was able to spend the time and effort on IASH that he did through those years. He was also responsible for choosing Prague for the 2009 Conference, which was thoroughly enjoyed by all who attended.

The IASH Board of Directors held its annual meeting in early May. It was reported that we currently have 215 members in IASH. Our membership has remained steady for several years. The Board discussed ways to increase our membership and to increase awareness of IASH. It was agreed to produce a 1-page information brochure about the Association and board members would bring them to conferences to distribute. We will all benefit from a greater awareness of IASH and I would also like to encourage all members to tell your colleagues about IASH. We can also make our PR brochure available to any members who wish to distribute them at any relevant event or location. It was also decided by the Board to distribute informational brochures by mail (not e-mail). Thus, we are currently assembling an appropriate mailing list. Any suggestions will be welcome. You can find the vision and mission of IASH on the website at [www.iash.net](http://www.iash.net). For your reference, following is the vision of IASH:

*To be the foremost international organization devoted to all aspects of the stability, handling, and use of liquid fuels from refinery to end use and disposal, utilizing volunteers to maintain the autonomy from single organizations or companies.*

Currently, there are 25 Board members plus two Supporting Members who share one vote on the Board. Ten companies have committed to Sustaining Membership in IASH for 2010 for total funding in the amount of \$50,000. Seven companies have committed to Supporting Membership for 2010 for total funding in the amount of \$14,200. They provide the majority of income to the association that allows it to function as an independent organization. Those companies are listed on the cover page of the *Newsletter*.

IASH ended 2009 with a minimal loss of \$7,407. As you are aware, this was due to several events beyond our control that led to the loss from the 2009 Conference held in Prague. However, we were able to sustain the loss and reduce it substantially with other income. Our budget for 2010 provides for income of \$73,200 and expenses of \$40,980 with net income of \$32,220. The IASH bank account had over \$150,000 at the end of the First Quarter 2010. Therefore, I am happy to report that the association is in good financial condition!

Mark your calendars to attend the 12<sup>th</sup> International Conference on Stability, Handling and Use of Liquid Fuels to be held 16-20 October 2011 at the Hyatt Regency in Sarasota, Florida USA. The organization of that conference will be in the capable hands of our first Vice Chair, Anthony Kitson-Smith. A Call for Papers will be sent out in mid-November.



## **1<sup>st</sup> Vice Chair's Article**

*By Anthony Kitson-Smith, ExxonMobil Aviation*

As my first article as the 1<sup>st</sup> Vice Chair of IASH, I would like to tell you about my experience in running a second London Marathon – and along the way helping two very important charities.

I guess it is a good place to ask the question why people run Marathon's. Are they running away or running towards something? Or are they just crazy? Most of my friends would suggest the latter in my case, and there has to be an element of madness in taking on a 26 mile run (42 kilometres for the metric minded) when you're over 50. Having done it once, knowing what it involves, you definitely have to be mad to do it again, and thereby hangs this story.

In 2008 I ran my first Marathon for charity, and raised over \$8,000 for poor and disadvantaged people around the world. I wanted to give something back having seen the disparity in the world – as a frequent business traveler living the “high life” relatively speaking in comparison to many that I have seen in my travels. We take for granted so many things that millions of people around the world don't have (and I'm not talking about i-pods).....food every day, clean water, light, heat, clothes, shoes, somewhere to call home.

So in 2008, after I had run the London Marathon, I said I would never do it again. My wife and children were so inspired by my effort that they decided to run in 2009, so out of “sympathy” I said I'd run with them. We all went into the ballot and I was successful, they weren't – so much for sympathy! Last year was a little busy, so I postponed my run to this year and thought that I might help some other charities. I was moved by some of the smaller, less well-known organizations that nevertheless do fantastic work. In the end, as I couldn't choose between them, I decided to run for both the Stroke association and Water Aid. Most of us will be familiar with the devastating impact of a stroke on both the person, but also their family. However, we may not be aware of how many millions of people in the developing world do not have access to clean water and indeed, have to walk on average 3 to 4 miles a day just to get the water they need to live! Water Aid works in some of the poorest countries in the world providing access to clean water and also sanitation – a real life changer and lifesaver.

I tend to run a few times a week anyway, just for health.....but at Christmas 09, the training started in earnest – this means ramping up the weekly mileage to about 25 in January 30 in February and nearly 40 miles a week in March. You also think about doing other sensible things like watching what you eat and cutting out the booze.....then the reality of frequent business travel kicks in and you accept that the world record is something for “next time”. The training was going well until mid March, and then when packing to check out of a hotel in Dubai, I caught my little toe on a chair in the room and broke it. One thing about Marathon runners – and it is part of the psychology – you never give up. Two days later I was running again. It hurt! 40 miles training a week became a bit of a dream, but I was getting about 20 miles in, so it still seemed possible.

Then in April, I found myself in Kuala Lumpur, a week before the race and there was some volcano in Iceland that had closed half of European airspace. My return flights got cancelled and I was faced with watching the Marathon on TV. The ExxonMobil travel people worked a bit of a miracle and I found myself traveling back to Dubai, then Paris, then the Eurostar train to London, just in time to register for the race. The weathermen said it would be a hot day! In England, never trust the weathermen. It rained and was cold for the first hour and never really got hot – I was grateful.

The race itself is quite a spectacle. Every mile of the route is lined with cheering crowds and it is great to have all this support. The start is very very busy and you cannot really run easily at your pace, but after a few miles, the runners spread out a bit and it is better. You have to watch your footing around the drinks stations (almost every mile) as the discarded water bottles are a hazard. You find yourself running with many thousands of people, almost all are raising money for charity (I think the London Marathon is the largest single fund raising event in the world – this year the money was about US\$ 100 million – not bad!!) There are just runners – like me – and then there are the real heroes in my view – the runners in costumes. There were some running in Rhinoceros costumes for save the Rhino, there was a young lady running in a 2 metre tall beer bottle raising money for children’s cancer charity, there were Firemen running in full fire-fighting kit (including the breathing apparatus and air cylinder....., there were even about 40+ people roped together running as a team. Just running the marathon is enough. To run in these get-ups is something else. I cannot imagine how they do it.

So how did it go? Well, OK up to about 20 miles and then the lack of training in the last few weeks really hit hard. I had been running on about a 4-hour finish, but “the dreaded wall” appeared at 20 miles and I had to accept that walking for a mile was the only way to continue. After the walk, it was possible to run again, but only another mile and then another shorter walk . At this point, with just over three miles to go, I recognized where I was in London and thought that the finish was close, so I set off running again. Slowly. The last couple of miles is running along the embankment in London towards the Houses of Parliament in the distance. This is the home stretch and it is a great feeling. Then at the Houses of Parliament, you take a right turn up towards Buckingham Palace and you are nearly there. Once you get to the roundabout in front of the Palace, you only have about 150 yards to go and now the finish is in sight. This is where you finally know you are going to make it.



Everything comes together and you “sprint” for the line. The feeling when you cross the line is simply indescribable. Very emotional, the body is sending you big thank-you signals as you have stopped the torture, but also you realize just how big a deal it is to run the distance.

So what happened next? After a shower and bit of a party with both of the charities (raised about US\$ 2500 for each one –AND a very big thank-you to all of my sponsors – I really could not have done this without you.) I was back to the airport and on a plane to Hong Kong! Not an ideal way to spend the night after running a marathon, but a very good talking point in the meeting I had to go to. It takes about 3 to 4 weeks for the tiredness in the legs to finally wear off, so now I am back in training again!! I stupidly agreed with a Greek friend last year to run the Athens Marathon in October. (Well it is the 2500 year anniversary of the original run in ancient Greece.) The man who ran in ancient Greece wanted to tell the leaders in Athens that the Greeks had beaten the Persians in a battle. He gave the message and died. Perhaps I now understand this.....my Greek friend showed me the “course” of the classic Athens marathon. You start in Marathonis.....and the first 20 miles are all up hill!! Hopefully, I’ll still be around for IASH – Sarasota in October 2011 to Chair the Conference. No more Marathons though!!

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## **IASH On-Line Library**

*By Shirley Bradicich, IASH Administrator*

The IASH On-Line library is up and running and can be accessed by all members through the IASH web site ([www.iash.net](http://www.iash.net)) by following the link to the IASH Library. All members should have received an Access ID and Password via email earlier this year. If you did not receive your ID and Password, please notify Shirley Bradicich via email at [sbradicich@iasn.net](mailto:sbradicich@iasn.net) and she will forward it to you. The library includes all past Conference Proceedings starting in 2000 through 2009, as well as all IASH Newsletters.

## **Monitoring the IASH Website**

*By Maurice LePera, LePera and Associates*

Monitoring the Internet traffic at the IASH Website (<http://www.iasn.net>) provides a means to gauge the activity levels and interest of those viewers who frequent the website. This is often referred to as Web analytics which is defined by Wikipedia as the measure, collection, analysis and reporting of Internet data for purpose of understanding and optimizing web usage. The monitoring of web analytics for the IASH Website began in April 2005. A means to analyze the statistics for the IASH Website, such as number of times the website was accessed, number of pages that were viewed, etc., became available from the support contractor for IASH, Encipher Design Studio. This analysis provided some interesting statistics. The metrics measured at that time were numbers of hits, visits, unique visits, and number of pages viewed. These web statistics were generated each quarter and continued every quarter until March 2007 when they ended due to the change in support contractors. With the new support contractor Meeting Expectations, a new methodology evolved for generating the quarterly statistics for the IASH Website.

The former system mentioned above employed metrics such as number of hits, number of visits, number of unique visits, and number of page views. With the new system that uses Google Analytics (<http://www.google.com/analytics/>), the following metrics are now being utilized: number of visits, number of pageviews, bounce rate, new versus returning visitors and click or click-paths. These metrics are viewed by Google Analytics as being the more informative in evaluating website traffic. Google Analytics does not measure the number of hits as they state the number of hits received by a website is frequently cited to assert its popularity, but that this number is extremely misleading and dramatically over-estimates popularity. A single web-page typically consists of multiple (often dozens) of discrete files, each of which is counted as a hit as the page is downloaded, so the number of hits is really an arbitrary number more reflective of the complexity of individual pages on the website than the website's actual popularity. The total number of visitors or page views provides a more realistic and accurate assessment of popularity.



## **Foreign Fuel Specifications**

*By Maurice LePera, LePera and Associates*

Since the principal focus and involvement within the IASH has been and continues to be centered on combustible fuel products, the easy access of fuel specification from within the United States as well as those from foreign countries became one of the goals to achieve early on. An ability to

access these different fuel specifications was of particular importance in view of the fact that IASH is an international association. As a result of this, the IASH website has listed under its Resources, a listing of fuel specifications from twelve countries as well as from three international organizations; namely, ISO, NATO, and CEN.

Seeking to add additional websites for other foreign fuel specifications, a recent effort has generated five additional websites providing information on fuel specifications from France, United Kingdom, Denmark, Finland, and Sweden. The listing of individual fuel specifications from these five countries are listed. These additions to the listing of fuel specifications will be added to the IASH website shortly.



## TECHNICAL NEWS

### **New Developments in Global Aviation Fuel Handling Equipment Standards**

*By Martin Hunnybun, Energy Institute*

Effective 30 June 2010, the Energy Institute (EI) will take over as the sole provider of a portfolio of equipment standards and operational recommended practices to facilitate the safe and efficient handling of aviation fuel worldwide.

For over 50 years the EI has provided publications for use by the international aviation fuel handling industry. Over the last decade, 15 of these titles have been produced and published jointly with the American Petroleum Institute (with a further six titles published by EI only, and two by API only). These include the well known laboratory qualification specifications for filters (e.g. 1581 5<sup>th</sup> edition for filter/water separators and 1583 6<sup>th</sup> edition for filter monitors).

After an organizational review, API has confirmed the responsibility for the aviation fuel handling portfolio will be transferred to the EI. The jointly branded titles will be superseded by technically identical EI reprints (document reference numbers and edition numbers will remain the same), made available through the EI only ([www.energypublishing.org](http://www.energypublishing.org)).

The EI is committed to continue to provide the global forum for the standardization of aviation fuel handling equipment, and operational recommended practices, ensuring that they reflect the consensus agreement of international technical specialists and stakeholders. The equipment standards in particular are followed worldwide by manufacturers, and adopted by international airlines, major and national oil companies, into-plane companies and aviation fuel hydrant operators.

The use of equipment that meet the standards is mandated in operational documents such as those provided by the Air Transport Association of America (ATA) and the Joint Inspection Group (JIG), and referenced in the International Air Transport Association (IATA) *Guidance materials for aviation turbine fuels specifications*. The EI will continue to maintain and develop the standards, and all users of the documents are encouraged to visit [www.energypublishing.org](http://www.energypublishing.org) for details of latest editions, reaffirmations, withdrawals and addenda.



## RESEARCH NEWS

### **New Fuels for the Fight: The U.S. Air Force's Actions and Objectives in Alternative Fuels**

*by Beatriz Rodriguez, Elizabeth Christensen, and Thomas Bartsch, U.S. Air Force Alternative Fuels Certification Office*

In 2007, the United States Air Force bolstered its commitment to power its fleet with non-petroleum based fuel with two important acts: it certified the B-52 to fly on a synthetic fuel blend and it stood up the Alternative Fuels Certification Office (AFCO). With the Secretary of the Air Force leading the way, Air Force leaders have recognized the national security implications of being dependent on foreign oil, and the creation of the AFCO was a vital part of the Secretary's Assured Fuels Initiative. Located at Wright-Patterson Air Force Base as a part of the Aeronautical Systems Center (ASC), the AFCO was chartered to manage the certification of all Air Force platforms (40+ aircraft), support equipment, and base infrastructure on a 50/50 blend of synthetic paraffinic kerosene (SPK) and the current military baseline fuel, JP-8, by the start of 2011.

In three years since the program's inception, the AFCO has accomplished the first U.S. flight of the SPK blend fuel using a B-52, the first transcontinental SPK flight using a C-17, the first supersonic SPK flight using a B-1, and additional aircraft demonstrations including the F-15, F-22, KC-135, T-38, C-5, C-130, A-10, F-16, and T-6. The AFCO itself does not have the authority to certify systems, but rather supports the certification efforts of a system's Single Manager, the responsible authority for airworthiness and operational safety, suitability, and effectiveness. Thanks to the support of countless engineering, test, and logistics personnel in the system program offices, AFCO's SPK program is on track to meet the Air Force's 2011 goal of full fleet certification.

The backbone to all this work has been a robust, handbook-based process to investigate airworthiness, safety of flight, materials compatibility, and a host of other areas on each system. The handbook, MIL-HDBK-510, was created through AFCO collaborations with the Air Force Research Laboratory (AFRL), the Air Force Petroleum Agency, and many other stakeholders. Formally implemented by ASC for USAF use and available for information for the other U.S. military services, the handbook documents a standardized process which can be used for the certification of other aircraft and related systems for not only the SPK fuel blend, but also for other newly identified aviation fuel types as well as for fuel additives.

### **ALFA-BIRD - Alternative Fuels and Biofuels for Aircraft Development**

*By Laurie Starck and Nicolas Jeuland, IFP; Marina Braun-Unkhoff and Patrick Leclerq DLR; Paul Bogers Shell Oil; and Olivier Salvi, EU-VRI.*

The European project ALFA-BIRD is dedicated to the evaluation of the most promising alternative fuels in aeronautics, at a middle, short and long term. In the ALFA-BIRD program, the fuel selection process is divided into two steps. The consortium has completed the first step, which consisted in evaluating 12 blends in terms of their quality as jet fuel based solely on standard characterization. These 12 blends were: FSJF<sup>1</sup>, FT<sup>2</sup>-SPK<sup>3</sup>, blends of FT-SPK with naphthenic cut,

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<sup>1</sup> FSJF for Fully Synthetic Jet Fuel

<sup>2</sup> FT for Fischer-Tropsch

with hexanol, with furane and, with FAE<sup>4</sup>, in different amounts. These results were used for the selection of the four fuels that will be tested in detail in the second phase: the assessment of the suitability of alternative fuels for aircraft. The four fuels selected are FSJF, FT-SPK, a blend of FT-SPK and 50% naphthenic cut, and a blend of FT-SPK and 20% hexanol. This fuel matrix offers the possibility to evaluate the potential of different chemical families, which are paraffinic compounds, naphthenic compounds and, oxygenated compounds. This is also representative of a short, middle, and long term view.

The purpose of this article is to explain the choice of the fuels that will be tested in the second phase of the project. This phase is concerned with a detailed assessment procedure that covers three main areas, i) technical requirements with respect to the full flight envelop, ii) material compatibility for aircraft and engine fuel systems and, iii) safety standards.

The selection of the fuel is based on the results of the analysis based on ASTM D7566 (Jet A-1 and 100% SPK) of the initial fuel matrix.

## **Diesel Fuel Stability Test Method Correlations for Contemporary Fuels**

*By Paul Richards and Steve Cook, Innospec Fuel Specialties*

Over the last few years, following step changes in both engine technology and fuel specification, there have been increasing reports of diesel engine fuel filter plugging and injector internal fouling. At the IASH 2009 Conference in Prague, Czech Republic, Drs Burgazli and Cook presented some of the work they and colleagues had been conducting to identify possible causes of these issues. This presentation highlighted some of the techniques being used to characterize the deposited material, in particular temperature programmed oxidation. The fouling and filter plugging issues have not gone away. Rumors abound about possible causes and laboratory tests have managed to generate deposits that are similar to specific isolated field problems. However, analysis of customer supplied samples has shown that these incidences do not account for the vast majority of reported cases and there are a number of possible causes of injector and filter fouling. Further, these causes may be due to single fouling sources or to synergistic multiples. A team of top scientists at Innospec continue to collect and analyse samples from the field and within the last year have published four peer-reviewed papers on this work. A typical analysis of an injector needle (Figure 1 and 2) showed via EDAX analysis that the deposits were mainly carbonaceous.



Figure 1 Typical fouled injector needle

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<sup>3</sup> SPK for Synthetic Paraffinic Kerosene

<sup>4</sup> FAE for Fatty Acid Ester



Figure 2 SEM of injector needle

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## CONFERENCES AND SYMPOSIUMS

### MARK YOUR CALENDARS NOW

IASH 2011, the 12<sup>th</sup> International Conference on Stability, Handling and Use of Liquid Fuels

Hyatt Regency, Sarasota, Florida USA

Dates: 16-20 October 2011

Call for Papers: 15 November 2010

Abstracts Due: 1 February 2011

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Other upcoming conferences and symposiums are included in the calendar on the IASH web site

[WWW.IASH.NET](http://WWW.IASH.NET)