

# Air cargo – the dangers within...

So, there you are, sitting with your watch in the crew room after a quiet day, with nothing more exciting than an overheating hand dryer in the airport terminal to deal with. Your shift is almost finished and your thoughts turn to your plans after work. That is, until the call from Air Traffic Control.



**Geoff Leach**

"Watch room, be advised we have a cargo aircraft inbound that has declared a Mayday due to a hydraulic problem and we have a full emergency. And the pilot has advised that the aircraft is carrying dangerous goods..."

"Dangerous goods"? The term conjures up all sorts of images, such as bombs, highly infectious substances and radioactive material and so you respond to the incident accordingly, preparing chemical protection suits, arranging for decontamination and requesting the attendance of the local authority. Because of the hydraulic problem, the aircraft overruns the runway and a fire ensues. This is quickly extinguished but now you have a trapped crew member, but you delay your rescue because of those dangerous goods on board and you must suit up in CPS. Or must you...?

An unlikely scenario? Well, certainly the aircraft overrunning the runway is unlikely (although possible), but an aircraft carrying dangerous goods is extremely likely, because not all dangerous goods are as dangerous as others, and they are routinely carried on both passenger and cargo aircraft. When complying with the very stringent requirements of the International Civil Aviation Organisation (ICAO) and the

International Air Transport Association (IATA), dangerous goods pose no more of a danger than any other cargo. Broadly speaking, dangerous goods are articles and substances which in certain circumstances could endanger an aircraft and anyone in it, and others who may have duties connected with the preparation of the flight. They are classified in 9 classes, some of which are sub-divided:

- Class 1:** Explosives
- Class 2:** Flammable gas; non-toxic, non-flammable gas; and toxic gas
- Class 3:** Flammable liquids
- Class 4:** Flammable solids; substances liable to spontaneous combustion; and substances which evolve flammable gas when in contact with water
- Class 5:** Oxidizing substances; and organic peroxides
- Class 6:** Toxic and infectious substances
- Class 7:** Radioactive material
- Class 8:** Corrosives
- Class 9:** Miscellaneous

▼ When used in conjunction with documentation, labels can be used to identify dangerous goods without the need to get close.



Image courtesy of Geoff Leach

Geoff worked for the United Kingdom Civil Aviation Authority for 32 years, 23 of which was spent working in the subject of dangerous goods. He was also Chairman of ICAO's Dangerous Goods Panel, which develops the requirements for the international transport of dangerous goods by air. He left the CAA in 2014 to form The Dangerous Goods Office Ltd, ([www.dgo-uk.com](http://www.dgo-uk.com)) providing consultancy and training in the subject.

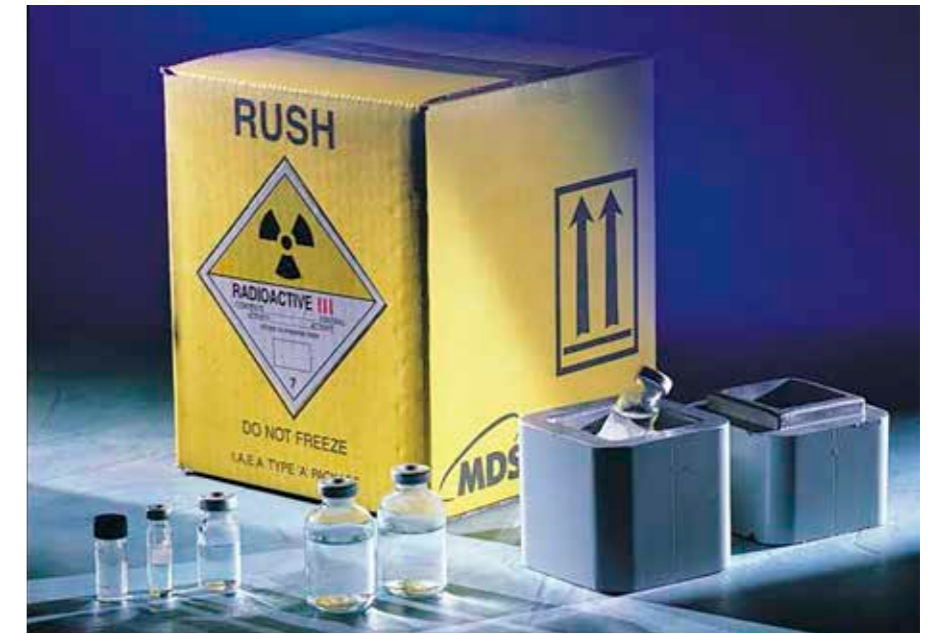
► It is essential that radioactive material, much of which is for medicinal purposes, is transported by air.

Some dangerous goods have one or more additional (or "subsidiary") hazards e.g. they may be flammable and corrosive. For some classes, a "packing group" denotes the degree of danger (I high danger, II medium danger, III low danger).

Whilst the items mentioned in the scenario would most definitely be classified as dangerous goods, it is less obvious that everyday items such as perfumes and aerosols would also fall into this category. Fire and rescue services can be in a "no win" situation when it comes to incidents involving dangerous goods. If they overreact, at best, they can be accused of using an incident as an impromptu (free) training exercise. At worst, delays caused by unnecessary preparations can result in a threat to life; in the scenario above, the rescue of a trapped crew member could have been delayed because the aircraft was carrying nothing more dangerous than a small quantity of household paint. Conversely, if the fire and rescues services underreact, and the cargo carried was indeed very dangerous, casualties could occur due to an inadequate response.

Clearly, obtaining information about any dangerous goods carried as cargo on an aircraft is critically important in determining an appropriate response to an incident in which dangerous goods may be involved. So, what information is available? This will depend on the stage at which the incident occurred; whilst the scenario above involved a landing aircraft, fire and rescues services may also need to respond to an incident involving a parked aircraft prior to or after flight, during taxi or after an abandoned take off. Incidents, such as leakage from a package, can also occur in a freight shed, where cargo may be loaded into unit load devices ready to be loaded onto the aircraft. The two most useful sources of information are:

**The Shipper's Declaration.** This is a document, which a shipper must provide with a consignment of dangerous goods, containing information critical in determining an appropriate response, namely the UN number (a 4-digit number specific to the particular dangerous goods assigned by the United Nations (UN)), the "proper



shipping name" which is also assigned by the UN and the class (or division) the dangerous goods fall under. It will also state the number and types of packaging which can assist in identifying which packages may be involved. 2 copies are required, one which accompanies the consignment to its final destination, the other must be retained at a place on the ground where it will be possible to access it within a "reasonable" period; what constitutes "reasonable" will vary from country to country but in this writer's experience 30 minutes should be considered as a benchmark. Where this document will be retained will vary and so this should be established as part of an aerodrome's emergency plan. The Shipper's Declaration is the document most likely to be available prior to the

dangerous goods being loaded on the aircraft e.g. in the cargo warehouse.

**The Notification to Captain (NOTOC).** This document is provided by the operator to the Captain and details dangerous goods which are carried as cargo on the aircraft. In addition to the UN number and proper shipping name, the NOTOC also states the loading location and so is particularly useful when responding to an incident where the dangerous goods are on the aircraft. This information must also be retained on the ground by whoever is responsible for operational control of the aircraft e.g. airline flight dispatch.

▼ Is CPS necessary or will normal breathing apparatus be sufficient?



Image courtesy of Geoff Leach





Image courtesy of Geoff Leach

◀ 110 passengers and crew were killed when an aircraft crashed in 1996 due to chemical oxygen generators being shipped improperly.

doesn't escalate. The following examples have been learned over 30 years of training airport fire and rescue personnel at Serco's International Fire Training Centre at Durham Tees Valley Airport in the United Kingdom:

- Use plastic tools to minimise the risk of sparks
- If safe to do so, put leaking packages so the hole in the package is upright;
- Use dry sand (or specialist equipment if available) to contain or absorb leakages;
- Prevent mixing – if you are unlucky enough to have leakages of different dangerous goods take measures to prevent them coming into contact with each other to avoid any potential dangerous reaction;
- Avoid walking in a spillage – apart from the obvious danger, this can result in inadvertent mixing;
- Use a thermal imaging camera to identify "hot spots";
- Don't commit personnel if there is no life risk – some dangerous goods will become unstable if heated and committing personnel when no life is endangered may put them at risk unnecessarily;
- Consider carefully if chemical protection suits are necessary or whether normal breathing apparatus would provide sufficient protection – CPS takes time to don and requires consideration of communication difficulties and, in hot weather, a danger of heatstroke if use is prolonged;
- Assess what is happening from all directions (wind direction permitting) – viewing from a different angle may reveal a label that wasn't previously visible.

In summary, in responding to a dangerous goods incident, it is essential to first determine what dangerous goods are involved and then obtain the information necessary to determine an appropriate response. When that response is in progress, measures can be taken to ensure the incident is dealt with in a timely manner, the incident is not made worse and fire and rescue personnel are not exposed to unjustifiable risk.

➔ For more information, go to [www.dgo-uk.com](http://www.dgo-uk.com)

Both documents can be many pages long and much time can be lost by seeking information on dangerous goods which are either not involved in the incident or which may not need specialist advice, such as the paint and aerosols mentioned previously. So, it is imperative to first establish what dangerous goods are involved in the incident. This needn't involve personnel having to get close to the offending packages as labels are intentionally conspicuous from a distance, although binoculars may prove useful. For example, if leakage is noted from a package bearing a red (flammable liquid) label and a black and white (corrosive) label, a check of the documentation may immediately reveal only one substance with both of these hazards (i.e. classes 3 and 8). Consequently, without committing any personnel, or incurring delays due to donning protective clothing, it is possible to very quickly establish what dangerous goods may be involved in an incident. When this has been done, the advice of a specialist agency can be sought, assuming this is considered necessary. When contacting a specialist agency, at least the UN number should be

provided which overcomes language and pronunciation issues which may occur with proper shipping names.

All the above presupposes that the dangerous goods have been properly prepared for transport and declared, by way of a Shipper's Declaration. However, it is a sad fact that some shippers offer dangerous goods "undeclared" i.e. in packages without any indication of what is contained within. This is usually because of ignorance, although occasionally unscrupulous shippers may deliberately flout the rules. Incidents involving undeclared dangerous goods are, by their very nature, difficult to deal with as the information available may be limited or non-existent and so it may be necessary for a closer inspection of the packages as there may be markings which could be of use to specialist agencies. In such instances if, for example, a chemical name is visible, it is important to give the whole chemical name as giving only part of it may result in inappropriate advice being provided.

Having received expert advice, there are certain measures which can be taken to minimise risk to personnel responding to an incident or indeed to ensure the incident

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