Magnesium Powder Accident

In an incident which we heard about recently, a year 9 class was heating magnesium powder `on tin lids' on tripods. The teacher, who was newly qualified, gave a group some more magnesium from the stock bottle, putting it on to an already hot lid. The powder sparked back into the stock bottle and the teacher took it back to the front bench. He tried to scoop the burning powder into the sink. When this did not work, he put the bottle into the sink and used water. This also failed, so he then tried a dry powder extinguisher. Probably the force of the jet blew some magnesium powder into the air, where even more ignited, flaring up, burning the teacher's hand and setting fire to paper in a waste bin.

There are several lessons to be learned.

- Firstly, it is questionable whether pupils of this age should be using magnesium powder at all. If the only purpose of the activity is to show the combustion of magnesium, the ribbon is far safer.
- Secondly, stock bottles should not be open, near where is a reaction is taking place. It is rather like firework safety - you take one firework out of the box, put the lid back on and hide the box out of the way.
- Thirdly, the fire-fighting methods were quite inappropriate. Hot magnesium will, of course, react with steam to produce hydrogen, which is the last thing you want. Most small fires in school laboratories are most simply dealt with by smothering with a fire blanket or heat-proof mat. A large excess of clean dry sand is also an effective way of dealing with metal fires. Unfortunately, the sand in fire buckets is rarely clean - it is preferable to ask technicians to put out a pack of sand whenever reactive metals are to be used. A 1 litre drinks container is suitable, and could be kept, appropriately labelled, in the laboratory.

Above all, however, this incident emphasises the need for science staff to receive training in emergency procedures. This does not require outside speakers: it can be done in-house, using readily available guidance, for example in *Safeguards in the School Laboratory* (10th Edition, ASE, 1996)* and the *Laboratory Handbook* (CLEAPPS 1988-97). Whilst the onus on employers (i.e. education authorities and governing bodies) to provide `safe systems of work', in practice experienced science staff are best placed to pass on their experience and to instruct colleagues at departmental meetings. If necessary, senior management should be asked to provide time, so that safety can form a regular agenda item and this training can take place.

An added concern is that this series of mishaps involved a newly qualified teacher, in his first few weeks in the job. Obviously, there are major time pressures on courses if initial teacher training, whether school-based or in HE establishments. However, it is incumbent on all concerned to ensure that sufficient time is devoted to safety training. Moreover, the Management of Health and Safety at Work Regulations require employers to provide adequate health and safety training for all new employees. While much of this may well be best done in-house, time still needs to be put aside for it.

*Current edition: Safeguards in the School Laboratory (11th Edition, ASE, 2006); in Scotland, see the SSERC Hazardous Chemicals Database.

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