

Are laboratories with peripheral benching safe & fit for purpose?

Introduction

Many schools are now being built or refurbished by using Public and Private Partnership (PPP) or Private Finance Initiative (PFI) schemes. Many of the laboratories built so far under these schemes seem to have a common design feature of peripheral benching carrying the services of gas, water, drainage and electricity and with loose tables and chairs in the central area. This layout is cheaper to build.

Implications for safety

Such designs have implications for safety and for the way in which risk assessments can be used and how a practical subject is delivered. It is easy to see that the teaching of practical science subjects in such rooms will be less safe than it is in many of the older lay-outs with island and peninsula benching. The use of the new laboratories with peripheral work-places was discussed with the staff in 15 PPP schools in one city and with staff in a number of other authorities. The undesirable aspects of doing practical work at peripheral benching are that:

(i) Pupils work with their backs to the teacher who then cannot see if they are about to take some dangerous action, either unintentionally or mischievously. Equally it's not possible to see if eye protection is being worn properly. We know some teachers use a variety of management strategies to mitigate the situation, eg restricting the number of pupils doing practical work so that only one side of a room is used at any time;

(ii) The valuable contact by eye is lost and what must be one of the best parts of teaching a practical subject is difficult if not impossible to achieve - that of discussing an experiment and its design with individuals as they are doing it. In addition these discussions often include gentle reminders on safety precautions. It is true that with the traditional island and peninsular benches a teacher standing in any one spot could have eye contact with only about half the class. However a few steps this or that way allows the other half to be faced;

(iii) With the high light levels near windows Bunsen flames will be nigh invisible and the risk of clothes and hair being set on fire will increase;

(iv) Gas taps and electrical sockets are out of sight making it easy for pupils to covertly tamper with them. Some of these taps have been sited far back or

are arranged in clusters with large spaces between the groups of taps. There have been cases of pupils knocking over apparatus, because of having to over-stretch, or reach past others;

(v) Pupils are easily distracted by looking out the window;

(vi) It is difficult for pupils to see demonstrations carried out by the teacher who has his or her back to pupils and is in front of the apparatus. The teacher will need creative footwork, half standing to one side and leaning across, a posture which is certainly not conducive to safe working with apparatus and chemicals. If laboratories have to be fitted with peripheral benching then a decent teacher demonstration bench is essential;

(vii) Some physics experiments and demonstrations are virtually impossible to do without an island or peninsula bench, e.g. propelling a trolley with twine attached to a suspended weight;

(viii) Where storage cupboards have been built above the benches many of these are low enough to give rise to a fire risk if Bunsens are lit underneath them;

(ix) When windows have to be opened for ventilation the draught will be at its strongest over practical areas with the resulting danger of blowing out Bunsens.

Advantages

There are a couple of plusses for the peripheral services model:

(i) During non-practical and book sessions all the pupils can be facing the front and not be sitting sideways as happens with island benches. Also discussion groups can be arranged round tables.

(ii) There are some safety advantages; test tubes being heated can be pointed towards the wall or window and hence away from both the user and others. In the event of an unexpected danger, pupils can move back into the centre of the room.

Conclusion

Many of these PPP and PFI schools have been opened with a fanfare and with politicians declaring that the community now has schools fit for the 21st century. There is little doubt that the overall environment in most of the new or refurbished schools has been greatly improved. However safety has been reduced in those science laboratories where practical work can only be done

on peripheral benches. If a cost/benefit analysis and a full assessment had been done beforehand unsuitable systems like these would almost certainly not have been built. Unfortunately those already built will have to be used for thirty years. It must be said that some teachers like the peripheral work arrangement with its flexibility of desks and tables in the centre, but most do not.

When practical work is carried out in these laboratories many of the general or model risk assessments made by SSERC [1], CLEAPSS [2], ASE[3] and others will not be adequate and will certainly need to be adapted for these circumstances.

The *DfES publication Building Bulletin 80 (revised 2004)* [4] shows 22 laboratory designs. None of these places all the pupils at window or wall benches; only six designs place a small number of pupils, between three and six at peripheral benching. Clearly the design experts considered an entirely peripheral lay-out unsuitable. It is a pity that the message did not get through to the designers of some of today's new schools.

References

1. www.sserc.org.uk/members/SafetyNet/HazChem/NewHaz15/Introduction/HAZ.HTM
2. *CLEAPSS Hazcards* (1995 updated 2004). New edition planned for late Spring, 2007. www.cleapss.org.uk/secfr.htm
3. *ASE Topics in Safety*, 3rd edition 2001; *Safeguards in the Laboratory* 11th edition 2006, *Chemicals List* on ASE web-site www.ase.org.uk/htm/book_store/list.php?KeywordString=Safety
4. www.ase.org.uk/ldtl/docs/BB80.pdf

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SCIENCE ACCOMMODATION in SECONDARY SCHOOLS



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