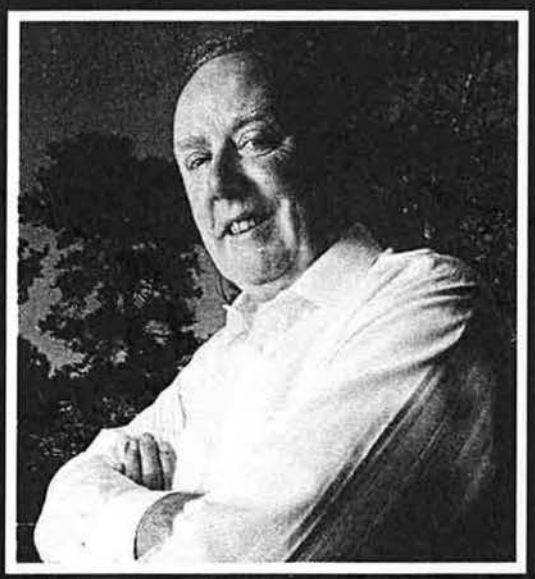
Eliminating waste – towards a sustainable future

From Rethinking Construction through to *Part L* of the *Building Regulations*, the building services profession is facing major challenges. Standardisation, sustainability, minimising waste and improving contractual relationships will be the CIBSE's focus for the coming year, as Institution president David Wood explains.



David W Wood BA CEng FCIBSE FIMechE MinstE MinstR, CIBSE president 2000-01.

Change is occurring fast in the building services profession. The drivers for change are many and varied, from the commercial agenda set by Rethinking Construction, to the environmental imperative created by the threat of climate change.

The CIBSE has an obligation to respond. It will be impossible for the profession to compete internationally unless we develop and improve to meet both the commercial and environmental challenges. Certainly we can no longer afford to build glass palaces which consume vast quantities of energy.

If the commercial agenda and the environmental movement has one thing in common, it is the need to eliminate waste. Waste from the construction process, and the waste of fuel and energy used to power our buildings. This can be done in a variety of ways: through better regulation, by enforcing energy efficiency, and by doing more to adopt the targets set by Sir John Egan in the report *Rethinking construction*. So how should CIBSE, and its membership, react?

The Egan initiative

When the Construction Task Force published *Rethinking construction*' the targets seemed daunting: 10% reduction in capital cost, a reduction in construction time by 10%, and a cut in defects of 20%. Egan also expected accidents to fall by 20%, productivity to rise by 10% and profits to increase by the same margin. While these targets are generally accepted by high level management, they do not appear to have been accepted by the 'shop floor'. We must use the lessons learned from the Movement for Innovation (M⁴I) demonstration projects to ensure that Sir John Egan's message penetrates all levels.

Minimising waste (and improving energy efficiency) is one area where building services can make a big impact. Around 43% of the energy consumed in the UK is used in buildings, and it should be possible to save at least 20% of this through improving insulation, reducing air leakage, increasing the use of energy efficient lighting and better system management.

Standardisation is another key area. Intensively serviced buildings could benefit from standardisation and factory prefabrication. Some contractors are making big strides with the latter and reaping the benefits of improved quality, reduced construction time, fewer defects and higher margins. Plantrooms are the most obvious candidates for this, but any intensively serviced building can benefit from standardised components as well as prefabricated pipework and ductwork. With the power of computer aided design there is no reason why we can't maximise the standardisation of equipment in building services.

On the contractual side, relationships have not improved dramatically. While there are many good examples of partnering, it should be encouraged on a much wider scale. The ideal design team should include like-minded players who are experienced at working together, and preferably in the same place. The contractor should be involved as early as possible and be allowed to influence design decisions, particularly where buildability is important.

Services engineers can use their influence to ensure that this happens. But you need support from your Institution. To provide that, the CIBSE has moved to promote the Egan message and the M⁴I by appointing a Rethinking Construction 'champion' – consulting engineer and former BSRIA chairman, Don Leeper OBE.

The Kyoto imperative

Over 150 countries have agreed to the Kyoto Protocol, the international agreement to reduce the emission of greenhouse gases by a target date of 2008 – 2012. Set against a background of continued economic growth, the target reductions average 5% below 1990 emission levels.

The protocol permits each developed country the flexibility to meet some part of its target

abroad. The use of 'bubbles' allows countries to implement their commitments jointly. Within the EC, where there is an 8% reduction bubble, the UK has agreed to a target reduction of 12·5%. Unfortunately, not all countries have signed up to the detailed implementation of the Kyoto Protocol. But the UK did commit itself in December 1999, along with other major countries.

So what does this commitment mean to us? First, the Government has an obligation to tighten the *Building Regulations* – for both new and existing buildings – in order to reduce energy consumption in the built environment. Second, there is a clear need for fiscal incentives to make businesses take energy efficiency seriously. This will be the role of the Climate Change Levy, due to come into effect in April 2001.

The latest proposals for modifying *Part L* of the *Building Regulations* include clauses applying to existing non-domestic buildings which are subject to "material alterations". Other proposed changes include improving structural and non-structural U-values, guidance on detailing, and air pressure testing. Minimum heating and hot water efficiencies are also proposed.

Compliance will be demonstrated by using the Energy Performance Index Method. This was originally designed to cover the mechanical ventilation and air conditioning requirements of non-domestic buildings, but has been developed to include heating and hot water services.

For the first time the *Regulations* will acknowledge what building services engineers have long known: that performance is dependent on proper commissioning. So it is good news that *Part L* now include proposals for the effective commissioning of building services.

While this news is welcomed by building services engineers, it is regretful that the *Regulations* are likely to reflect current practice and not promote radical change. Indeed, initially the proposals will not dramatically affect the overall level of UK energy consumption.

CIBSE must press for such improvements to the *Building Regulations*. And with the expected increase in refurbishment projects, it is particularly important that regulatory changes are geared to improving the quality of existing buildings. In short, it is time to use the stick rather than the carrot.

The climate change levy

A problem of the *Building Regulations* is that they are a very slow way of achieving meaningful improvements to building energy efficiency. For example, it has taken 40 years to ensure that 70% of roofs are insulated. Hence a mechanism is required to get a relatively more immediate improvement, and the Government has decided that a fiscal incentive – the Climate Change Levy – is the best approach.

The original proposals for a climate levy have been scaled down, largely due to representations from the CIBSE and others for a more workable system. The rates are now likely to be set at 0.15 p/kWh for gas and 0.43 p/kWh for electricity. Fuel oil is still excluded. The proposals will also include a trebling of the financial support for energy-efficient measures – about £150 million in "enhanced capital allowances" – and an energy efficiency fund in 2001-2002.

The Government expects the levy to save at least 3 million tonnes of carbon dioxide emissions by encouraging switching to renewable power and extra investments in energy efficiency. The tax will not come into effect until April 2001, but will raise £1 billion in 2001-2002. Most of this will be recycled back into business by cutting employers' national insurance contributions by 0·3%.

Unfortunately, energy remains relatively cheap, and it is doubtful whether the Climate Change Levy will have a significant impact on the medium and smaller-sized firms. To achieve its manifesto commitment to reduce 1990 CO_2 emissions by 20%, the Government will have to introduce measures to save 34·4 MtC. The Climate Change Levy is thought capable of saving 3 MtC from industry, but where is the balance of 30 MtC going to come from?

Research by the BRE and BRECSU shows that if all cost-effective energy saving measures were applied in buildings, around 20 MtC could be saved. Yet the majority of the effort seems to be directed at the fiscal measures, which will save only 3 MtC at best. Clearly, with global warming proceeding at such an alarming rate, the CIBSE would like to see more action now to minimise the effects of climate change.

"Minimising energy wastage will provide an example to the world of the practical ways to achieve a sustainable future"

Sustainable development

Perhaps the key message to the building services industry is that the Climate Change Levy represents one of the greatest business development opportunities the industry has ever had – provided that the industry responds and rises to the challenge of providing sustainable, energy efficient solutions for new and existing buildings.

For engineers, this means encouraging the maximum use of existing buildings, designing for minimum waste, aiming for lean construction (avoiding over-specification and using mock-ups to eliminate errors etc), minimising energy consumption, and conserving water resources. In this, building services engineers should be crusaders for energy efficiency, ensuring that clients are given the best options for conserving energy over the life of a building.

More focus should be on sources of renewable energy rather than fossil fuels, and more on intrinsically efficient rather than resource-intensive designs. If possible ideas such as low-flush toilets, energy efficient windows, smart switching of lighting (manual on and automatic off) and clear labelling of occupant controls should be implemented.

The problem with selling these messages to clients is that wasting energy is not illegal. Energy is also very cheap. While a bottle of (blended) whisky costs £12, a litre of petrol is around 78 p and a litre of fuel oil is about 21 p. But the likelihood is that by 2010 the UK will not have sufficient reserves of oil and gas to meet its own needs, and become dependent on imported fuel at a higher price.

If we are to have a sustainable future, we must produce buildings which use a minimal amount of energy during daylight hours. A recent study has indicated that houses which were modified to maximise passive solar energy would use 26% less fuel for heating when compared with conventional houses[2].

The future

As energy efficiency and sustainability becomes more important, CIBSE's role will be called upon to provide more guidance. And inevitably, the ways in which we attempt to minimise energy use will become more sophisticated.

While the Institution currently aims its guidance at designers, increasingly it will need to provide advice for other professionals and particularly for refurbishment projects. The PROBE research studies show how important it is for a building to operate as its designers intended and to its maximum potential. I believe this will not happen until designers are expected to work to mandatory operational carbon dioxide targets, and clients are are forced to include energy efficiency performance criteria in their annual accounts. Mandatory energy labelling would also enable designers and clients to choose the most efficient products and thereby improve the likelihood of real cuts in energy consumption.

Currently, the price of electricity and gas actually becomes cheaper if you use large quantities. There should be some discouragement for using ever-increasing amounts of energy. Surely it would be better to have a method of rewarding users who manage to reduce consumption and to penalise those who waste energy?

The CIBSE has an obligation to ensure that its professional guidance takes the lead. In the past the CIBSE has tended to be reactive, but it must become proactive, anticipating future revisions by stating why documents may need improving and identify the long-term objectives. This is particularly important in respect of the *Building Regulations*, where legislations should be extended to existing buildings as soon as possible.

Acknowledgments

David Wood would like to acknowledge the help and assistance of numerous sources in the preparation of this presidential address, in particular Sheila Renn of Gibb Ltd and Richard John, secretary and chief executive of the CIBSE.

References

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