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"Demolish with Safety"
by Robin Powell, MD, DSM Demolition

The Construction Section Chairman, Gerry Mulholland, introduced the Speaker, Robin Powell of DSM Demolition. He added the comment that it wasn't often that a Managing Director took the time off to address a BHSEA meeting and that this demonstrated a very special commitment to health and safety! He added that Robin had also been a very active member of the Midlands Working Well Together Action Group and, before that, had served on the Construction Industry Advisory Council.

Gerry then handed over to Robin to add any missing details about his career in Birmingham City Council, before joining DSM as Managing Director 19 years ago!

Robin added that he was a Member of the Institution of Demolition Engineers and that his previous job as the Demolition Officer for Birmingham City Council had led naturally to his present position!

Robin started his presentation by posing the question about the "The secrets of safe demolition". Very quickly he answered this by adding that, really, "There are NO secrets!", but that there was good guidance in: -

- The Construction Design and Management Regulations.
- The British Standard for Demolition
- The British Standard for Explosives

As an aside, he mentioned that one of DSM's "claims to fame" was that it modelled for a photograph on the front cover of HSG 224, which depicted their project at Newcastle Football Ground.

The most important objective for demolition engineers was to avoid the "unplanned fall", which could usually be laid at the door of the "untrained contractor. The solution was to make careful arrangements for a "planned collapse" and he cited an example in Liverpool where a design flaw resulted in a serious accident. British Standard 6187:2000, Code of Practice for Demolition gives recommendations for: -

- Identifying and establishing responsibilities during all phases of the demolition process
- Acquiring a knowledge of the site, including its former use
- Appropriate environmental management
- Managing health and safety hazards
- Carrying out risk assessments and planning the work accordingly
- Establishing and managing processes effectively
- Determining and managing safe exclusion zones

Clause 5 of this Standard covers Planning and Managing projects in some detail by indicating an approach to key considerations: -

- Effective site knowledge
- Legal compliance
- Programme management
- Arrangements for protecting the public
- Arrangements for structural stability
- Environmental management
- Occupational safety in the workforce
- Predicted weather conditions
- Planning and managing site work
- Risk Management and Control
- Health and Safety Plan preparations
- Method Statement Preparation
- Avoidance of unplanned collapse
- Supervision
- Competency & Training
- Quality Assurance
- Information Technology

One of the safest forms of demolition is that which uses explosives, especially on high-rise developments. This is because it removes people from the process of taking down the structure from a height and transforms it to a more stable condition. This is true, not only for the workforce, but also for the public for whom the duration of the hazardous stage is reduced. British Standard 5607:1998, Code of Practice for the safe use of Explosives in the Construction Industry, covers the safe storage, handling, transport and use of blasting explosives and accessories in the construction and demolition operations.

Clause 4 covers the general recommendations for handling safety
Clause 6 covers demolition operations

The 'text book' for demolition work is widely considered to be the British standard 6187:2000, whose principles are also supported by the CDM Regulations. The Standard gives recommendations for: -

- Method statements
- Exclusion Zone design
- Explosives
- Blast Protection
- Security
- Site Survey/Risk Assessment
- High Rise structures
- Other Structures
- Safety

This guidance has been developed over the years from a position where the Demolition Industry was considered to be the Cinderella of Construction! This was because of its low cost and/or small proportion of most projects; its low/negative value; low skills involved; low esteem; low safety record. The change has come about very greatly because of the effect of good campaigns and organisations in the industry. Examples are: -

- Industry Groups
- Investors in People
- Incident and Injury Free campaigns
- Working Well Together (WWT)

BHSEA is strongly committed to the WWT campaign, having set up a local Action Group in the West Midlands, some 5 years ago. Nationally, the campaign organises Roadshows to bring the safety message, in an exhibition trailer, to a number of the larger construction sites in the region for a day's visit. A parallel programme brings a smaller scale "White Van" display to the smaller sites for only an hour at each location.

The Incident and Injury Free campaign is aimed at changing hearts and minds by uniting the Industry with a systematic approach. It does this by enabling and enthusing all personnel to care for themselves and their colleagues, both at work and at home! This has sometimes been called the "24/7 Worker concept", on the basis that accidents at work affects social life and private lifestyle could have an adverse effect on work performance. In other words, "Safety is for life, not just for sites" and the Site signs which proudly boast "Safety Starts Here" are sadly misguided!" This campaign is vigorously supported by the Major Contractors, such as Bovis Lend Lease and Laing O'Rourke.

This growing professionalism in the Industry is benefiting from the establishment of the following Organisations to represent specifically the interests of: demolition companies and individual demolition engineers: -

- National Federation of Demolition Contractors (In the process of starting an Audit Scheme)
- The Institute of Demolition Contractors
- The Institute of Explosive Engineers (Also covers Quarrying, Fireworks, Sealed Knot Society and Media Props.)

In illustrating the Risk Assessment process, Robin stressed that the most important Control Measure was to "Eliminate People", although he also stressed that this was not in the "Dalek" mode! No, it started with measures to eliminate, wherever possible, the use of scaffolding, propping, crash decks and temporary works. This is achieved by adopting remote demolition techniques using basic machines developed into: -

- Purpose designed Demolition D-Rigs based on standard plant, but with a very specialised specification.
- Standard D-Rigs with demolition protected cabs and equipment
- Remote controlled machines such as hydro-electric Broks
- Medium 10-20 metre, High 20-40 metre and Super High 40+ metre high reach D-Rigs. (These can cost in the region of £0.8m - £1.0m each!
- Designed collapse – with no people closely involved

Robin showed us several photographs of high-rise demolition using high reach rigs and said that the telescopic designs were better on the lower floors because of the improved access. He went on to say that an impressive 80% of demolition materials were recycled and DSM were closely involved in research to alter the physical nature of Asbestos so that it could be re-used safely!

Looking to the future Robin joked that, although the "Planet Removal Demolition Beams", used by the Vogans to make a Hyper-space by-pass in the Hitch-hiker's Guide are not yet available, the Demolition Industry was working on: -

- The use of lasers to clean and reclaim bricks
- The use of Microwaves and Ultrasonics to pre-condition structural elements so that crushing forces could be reduced by as much as 75%.

Robin then went on to talk about the most impressive technique in the Demolition Engineer's armoury – explosives! He said that it was definitely the safest method for the tallest buildings and used high-speed explosives, which could be used in a closely controlled way. Contrary to the common portrayal of the magneto powered electrical detonators, beloved of filmmakers, modern explosives were set-off by Non-electrical (NONEL). This used a "shock tube" initiation system, developed by the Nobel Company, which had a triple wall and contained Aluminium Oxide dust with a speed of 2,000 metres/sec! The reason this system found favour was that it is not subject to premature detonation by stray magnetic fields, an understandably sensitive issue for demolition engineers!

Robin explained that the charges were laid in accordance with a carefully designed plan. On the ground floor they were usually placed in a 30 mm hole, with progressively reduced charges placed on intermediate floors, in smaller diameter holes. All structural columns are colour-coded so that they get the right size of charge. The detonation plan also includes graded timings in a Detonation Sequence, with delay mechanisms at splitting points throughout the building. The charges could even be designed to move a building sideways, as it fell, or even twist it on its own axis! Another vital safety measure was the use of chain-link fencing wrapped in geo-textile to reduce the spread of debris as the structure collapsed. Another key element of the explosion technique was the evacuation of people, workers AND members of the public, to safe areas outside the Exclusion Zone. On one job, this involved the ***partial*** evacuation of an Old Person's Residential Home so that disruption to vulnerable people was minimised, compatible with an acceptable level of risk.

Robin illustrated his presentation with several video clips of high-rise blocks and a spectacular sequence of the 830 ft. radio transmitter masts at Rugby, previously used for the Nuclear Submarine fleet. This job did not go exactly to plan, however, as rabbits gnawed through the Nonel tube on the night before the demolition!

Member's Questions

Gerry Mulholland of Carillion Roads started the Question Time by making the comment that, over the years, the demolition industry had been very innovative in the health and safety field. They had ably demonstrated that good Planning was the recipe for success and the cost of individual items of plant underlined the serious commitment to safety. There was also an impressive commitment to environmental protection, with 95% of the structures being recycled!

Andrew Hornby of AYH asked about the demolition of gas-holders and Robin replied that the Principal Contractor carried this out and that the gas was fully contained so that the ground was not contaminated.

Gerry Mulholland described a situation where a building was 'sold on' to another person, who then removed it to another site. Robin stressed the importance of making sure that a qualified, competent demolition contractor was used for this operation and

cautioned that it was essential that the dismantling and subsequent re-erection be done by the same person!

Dawn Phillips of Wolverhampton City Council asked what was Robin's experience with the effect of the CDM Regulations on the quality of information supplied to demolition engineers. Robin Agreed that things were getting better because clients were looking more carefully at the "whole life" of structures. Dawn then extended her question on to the issue of whether the added teeth given to the new Co-ordinators under the proposed CDM Regulations 2006 would be beneficial? Robin said that CDM is better because it makes people live up to their responsibilities. He added that it aims specifically at clients and designers in that respect.

Andrew Hornby asked if demolition experts were brought in at the last minute on project planning. Robin agreed and added that obviously "earlier is better", but other professions seem to think they know better! He went on to say that accidents on the Millennium Dome project went up because of increased time pressures and that he hoped that the same would not happen on the new construction for the Olympic Games.

Andrew Hornby then asked for clarification of Robin's earlier mention of research into disposal of asbestos. Robin explained that the DSM Environmental division was working with a German partner in Hockenheim who had devised a process for transforming the nature of asbestos into a cementitious clinker that removed the danger. Robin also said that DSM was working with Liverpool University on the use of laser technology to reclaim bricks.

As there were no more questions, the Chairman closed the meeting and the members showed their thanks to Robin in the traditional fashion.