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MANUAL HANDLING OF HIGHWAY KERBS – FOCUS GROUP FINDINGS

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Abstract

The manual handling of concrete highway kerbs remains commonplace in the construction industry despite obvious risks to operatives. A study was commissioned to find out why the operation still includes manual handling, what alternatives exist and how the organisation of the work affects exposure to risk. Although this study involved a literature review and visits to examine manufacture, supply and installation of kerbs, the focus groups which were held with industry professionals to discuss manufacture, installation methods, design and training are reported here. Related published research was very limited and the visits confirmed manual handling to be widespread for installation but eliminated or controlled in other areas of the process. Risks to health of construction workers remained as they were not considered in the design of the product, design of the work or identified and controlled through risk assessments. Focus group findings highlighted manufacturer's myopia, lack of installation knowledge of designers and shortfalls in training of installation work. Recommendations from the research are that a pro-active approach to health needs to be adopted by the manufacturers of heavy construction products. Designers of work

requiring the use of heavy products need to have more experience of site operations, and training of manual handling awareness should be performed at all levels in construction organisations.

Keywords: Construction Safety; Health of Construction Workers; Construction Ergonomics

1.0 Introduction

Concrete kerbs are used in many other countries throughout the world as an element to separate the roads from pedestrian footpaths and to control the flow of surface water from roads into drainage systems. Kerbs accentuate the boundary between the carriageway and adjacent highway areas and can have an important function concerning drainage or structural support of the carriageway. In the UK urban all-purpose roads, urban motorways and slip roads are generally kerbed at all carriageway edges (Highways Agency 1989).

Kerbs are also an integral part of housing estates, industrial and retail complexes and transport networks and around 4% are replaced every year, in the United Kingdom (UK). In the UK, concrete kerbs, weighing around 70kg, are widely used. As the kerbs are heavy, laid in large numbers and installed at ground level this represents a considerable risk to the health of the workers who install them by hand. There is a strong positive relationship between work related upper limb disorders (WRULDs) and combinations of repetition, force and postural work (Buckle and Devereux 2002)

Figure 1 - Here

The installation of highway kerbs is a construction activity. The UK Government's Health and Safety Executive (HSE) reported that 5600 out of 100,000 people whose current or most recent job was in construction in the last eight years suffered from an illness which they believe was caused or made worse by this job (HSE, 2003). The attention to health and safety (including ergonomics) in the construction industry has been rather poor compared to other industries (including office work). At only a few places in the world, institutions or centres have been active in this field over a long period of time (Koningsveld and Van der Molen, 1997).

Despite this lack of attention there are regulations which, if adhered to, would remove manual handling of heavy construction products on building sites. However, regulation of construction activities has not had the hoped for impact with regard to health and safety (Baxendale, Jones 2000). The Health and Safety Executive (HSE) in the UK has made manual handling a target for enforcement. In the construction industry they have previously been instrumental in reducing the size of material bags from 50kg to 25kg and restricting the manual handling of heavy concrete blocks for walls. With the increased emphasis by the HSE on manual handling of kerbs in 2002/03, UK industry began to look at the issue and this led to the sponsorship of this work by the Construction Health and Safety Group (CHSG).

The manual handling of prefabricated concrete elements during manufacture was investigated in the early eighties (Grandjean 1983) and a later study (Burdorf et al. 1991) showed that workers handling these products were almost three times more likely to experience back pain than a control group of maintenance workers. While the

manufacturing sector has made great strides in improving occupational health and safety, advances in the construction sector have been limited (Gyi et al. 1998; Gervais 2003). Research has been carried out into health issues in highway construction work (Pacquet, V.L. et al. 1999) but the work activities investigated did not include the manual handling of highway kerbs.

The aims of this paper were to examine:

- Why manual installation of kerbs is still used.
- What alternatives to manual handling exist.
- What barriers prevent a move from manual handling to the use of alternatives.
- What changes are needed to the construction process to eliminate manual handling of kerbs.

2.0 Methods

2.1 Desk study, contact with industry and site visits

In addition to the focus groups, the study involved a literature search, contact with industry (dedicated web page, project information sheets) and site visits (kerb installation, manufacture and lifting equipment demonstrations). While the results from the latter elements of the research are not presented in the current paper, they served to supplement the focus group findings.

2.2 Focus Groups

Focus groups can be linked with other techniques to support the discussion, triangulate data, or add insight through a variety of additional activities (Bruseberg and McDonagh-Philp 2002). It was intended as part of the overall research into the manual handling of kerbs to use the focus groups to support individual interviews, site observations and equipment assessments.

Three focus group meetings, with a number of industry professionals (total n=24), were held to discuss topics associated with the kerb installation work (table 1). The areas covered included manufacture, lifting equipment, design issues and training. Five to six questions (tables 2 – 4) were developed prior to each meeting to assist with guiding discussion within the group.

As recommended (Christie, Scane and Collyer 1995), the group numbers were kept between five and ten members. Also, as ergonomists and designers have extended the usefulness of the basic group by making adaptations to discussions such as integrating activity tools to aid generation of new ideas (Langford and McDonagh 2002), an exercise was used at each group meeting to act as a break from the round table discussion. The groups were split into two with each half working to investigate a particular problem. Results from the design and training group exercises are shown in tables 5 and 6.

Meetings were recorded and later transcribed. The transcripts were used to identify themes and key points.

3.0 Findings from focus groups

3.1 Spectrum of kerb operations

Kerbs are used throughout the construction sector from major highway projects to small domestic works. There are a number of ‘new build’ applications, but most involve replacement as part of an upgrade, road re-alignment or damage. The replacement of damaged kerbs is particularly problematic. Multiple handling of kerbs occurs on housing projects where the kerbs installed at the beginning of the project are inevitably damaged throughout the project and then have to be replaced before the roads are handed over to the local authorities. This practice has implications for all the main stakeholders. Contractors install the kerbs early because the developers want to sell the first phase of houses before the later phases are complete and the viability of the sales depends, in part, on the kerbs and the footpaths being in place. This is also sometimes set as a ‘planning’ requirement by Local Authorities. The contractors actually install the kerbs, as part of the access roads to enable houses to be built and, of course, are responsible for causing the damage itself, during the house construction, although in many cases this is some what inevitable.

3.2 The continued use of manual handling

Concrete kerbs have been used in the UK for around 70 years, replacing natural stone kerbs which were used for many years before that. The use of a kerb detail on UK roads is expected (Kerbs are included in standard details for roads produced by the UK

Highways Agency) whereas, in mainland Europe, many rural roads would have an extended verge detail instead.

The operation of manual handling of concrete highway kerbs continues despite the knowledge in the industry that it causes injury. It was reported in the focus groups that workers who regularly lay kerbs are known to have back problems by the age 45 and more serious disabilities by age 55.

Our investigation demonstrated that the work in the UK is still carried out manually for a number of interrelated and complex reasons. These include manufacturing myopia, designer reluctance, worker factors, training limitations and constraints on the Health and Safety Executive.

Manufacture -

As the basic kerb product pre-dates health and safety legislation, it was not designed with health and safety as a consideration. Due to commercial and environmental factors, attention to the product has been limited to performance issues.

Industry experts, in the focus groups, claim that this has increased the extent of damage to the kerbs, as weaker concrete chips more easily, leading to more manual handling. Workers now therefore need to take extra kerbs to a job to allow for breakages.

Design -

The designers use kerbs because they are the recognised form of construction and are made to a British Standard. They are either unaware of the methods adopted by the

workers to install the kerbs or have no appreciation of the impact on the health of the workers by this process.

It was the view of the focus group that designers believe the responsibility of choosing method of installation lies with the contractor. If the contractor is left to choose the method of installation the choice will be governed by cost. The manual handling of kerbs is the cheapest method of installation.

Workers -

The concept of long term injury is difficult for workers to accept. We now control exposure to vibration to say 30mins every 4 hours for some equipment but the message for vibration is easier to get across because it is easily identified as work related.

It was claimed in the focus groups that roughly 3 out of 4 construction workers have a bad back. With this number of workers experiencing health problems it suggests to them that the work is harmful but they continue to do it with an 'it won't happen to me' attitude.

It was suggested in the training focus group that workers think they are doing their employers a favour by taking short cuts and those willing to be flexible are rewarded. This creates a culture on construction sites that affects newcomers, changing their behaviour to one of risk takers. It was reported in the focus groups that workers had attempted to manual handle special bus stop kerbs weighing in excess of 100kg because the bonus offered on their installation was good.

Training -

It was reported in the training focus group that training courses for kerb laying provide instruction on regulation, personal protective equipment (PPE), manual handling, risk assessment and also provide practical instruction. However, only very limited attention is given to the potentially harmful health effects. Health and safety is mentioned in the introduction then not mentioned again.

Views expressed in the training focus group were:-

- Experienced workers attend training and then return to work and carry on as before
- Instruction can be undermined by the more physically able workers who think that they do not need to consider using mechanical aids
- Manual handling training varies considerably in the industry. From half day courses to being instructed to ‘watch your backs.’
- Workers told to forget their training once back at work because it costs the company money to work that way

Consensus was that, once the training courses have been completed, health and safety is rarely policed on site and bonuses or incentive schemes encourage the workers to continue laying kerbs by hand as they perceive that other methods would slow them down. It was suggested that the workers would benefit from support from the organisations that employ them and that the best way to achieve this would be to train staff at all levels in the organisations. It was thought that companies sometimes omit managers from manual handling training because they already have a degree education, which is assumed (perhaps inadvisably) to have included such training.

Health and Safety Executive -

It was reported that the HSE had asked their inspectors to concentrate on the manual handling of kerbs but had not provided any guidance as to how this was to be done. This led to confusion in the industry because of different approaches in different areas. Without a uniform approach, many contractors found it easier to continue with the recognised practice of laying kerbs by hand.

3.3 *Available alternatives to traditional methods*

Changes to existing kerbs -

It was found that efforts had been made by manufacturers to tackle the manual handling problem with: kerbs being reduced from 915mm to 500mm in length; the depth of kerbs being reduced from 125mm to 100mm; and the use of lightweight concrete. Suggestions were raised that other alterations could be made such as the addition of hand holds or making the kerbs bigger (therefore heavier) to 'force' mechanical handling.

Lifting equipment -

It was felt that the use of lifting equipment was of great benefit to the work as well as the worker as this would reduce the risk of injury to the worker by removing a considerable manual handling operation. This, along with the greater control available for the manoeuvring of the concrete unit by the equipment, should enable improved levels of accuracy to be achieved as the workers become skilled in the use of the equipment.

Figure 2 - Here

Several devices currently available have been designed specifically for lifting kerbs (manual lifting clamps, stone magnets, vacuum lifters). But the mechanical lifting technology is not just restricted to kerbing as it can be used for stone copings, steps and other heavy products. The technology is more transferable to the bigger and more complex projects but it is evolving all the time.

Alternative products -

In situations where kerbs are installed alongside road drainage a combined kerb/drain such as the ACO product (figure 3) replaces two heavy manual handling operations with one lighter operation. However, the wet process used to manufacture this lightweight, resin impregnated, product makes it less suitable for mass production than the pre-cast concrete kerbs, increasing unit costs.

Figure 3 - Here

Recycled products are being developed which support sustainable construction. Kerbs made from old tyres have been used for maintenance work where kerbs are regularly damaged by heavy traffic. Plastic technology has been used to develop a kerb which is being targeted for use in the maintenance market and has the same profile as a traditional concrete kerb. These meet the need for replacement of kerbs damaged in cul-de-sac work, where lifting equipment is difficult to employ, to reduce replacement costs. They are very light, weighing around 9kg, and through their versatile manufacturing process may enable the kerbs to be produced with a concrete

appearance, in a variety of colours or with internal lighting for road safety or visual effect.

Alternative methods -

The use of slip form construction (kerbs formed by extrusion of concrete through vibrating formers) for kerbs in the UK has been carried out for decades but appears to have been unable to compete, commercially, with the traditional installation of kerbs by hand. The HSE have been considering new restrictions on the manual handling of concrete kerbs, therefore the slip form method may now become more viable.

The use of a milling machine to grind up concrete kerbs has largely replaced the removal of concrete kerbs by hand, on large contracts, partly due to the cost of disposal of concrete kerbs.

The repair of stone kerbs, using proprietary materials, has been carried out as an alternative to replacement. A similar system for concrete kerbs would reduce manual handling where replacement occurs on the handover of estate roads to Local Authorities.

3.4 Barriers to the use of new methods

Method of installation -

The view from the focus groups was that the use of a shorter, 500mm, kerb would not reduce manual handling:

- In the end the same amount of concrete is being handled, or more if the lighter weight encourages workers to lay more.
- A person may be more likely to lift a shorter kerb than a traditional kerb.
- The weight of the smaller kerb is still high and smaller kerbs would increase cost of production.

Changing the design of concrete kerbs to include hand holds is likely to reduce the risk of injury only slightly because the weight would still be in excess of 60kg and the kerb has to be installed at or around ground level.

The manual lifting clamps improve the posture of the workers but have very limited use. They appear suited to lifting the kerbs onto the concrete bed from an adjacent position but impede normal movement representing a fall hazard if attempting to move the load over any distance. In addition they add to the overall load being lifted which is not shared equally if the height of the two operatives is different.

Vacuum lifters remove the lifting requirement from the installation of the kerbs but have certain drawbacks:-

- More space is required to operate them than for manual handling.
- The part of the equipment that supports the kerbs needs to be level to work.
- Kerbs need to be delivered on pallets for fork mounted devices.
- Shovelling and hammering operations are still required.
- The noise of the machine may be a problem.

Slip forming equipment is more suited to continuous runs of kerb with little deviation.

“It has a problem where lots of dropped kerbs are required “

Attitude –

It was argued in the design focus group that it may be difficult to replace kerbs with, say, extended verges, because of public expectation. It seems that the UK public perception is that roads should have a concrete kerb along the edge whether on their housing estate or on a country road.

The installation of the concrete kerbs provides a definite border to the roads.

There is resistance to change from some operatives and this can be compounded by lack of supervision on site to ensure the work is being carried out with the required lifting equipment. Those workers who have been used to installing kerbs by hand prefer the old methods because it means they can use their hands.

There is concern for prospective developers of new products that the market is very conservative. It was suggested that one problem with introducing alternatives is that designers like the protection of Standards (eg BS 7263-1:2001). Manufacturers in the first focus group were worried about changing from the Standards and the effect this would have on the robustness of the product.

Cost -

Unless new products are commercially viable they will not be used. In a competitive environment, firms will use the most cost effective methods. For years this has meant the use of concrete kerbs and manual labour.

3.5 Actions required by the key stakeholders

Manufacturers -

The first focus group argued that manufacturers of concrete kerbs have to consider how the kerbs are delivered to site. At present the packs of kerbs weigh over a tonne and have to be split before they can be moved by lifting equipment on site. The manual handling of timber pallets is carried out on site because vacuum lifters require

the kerbs to be stacked on a pallet and packs of kerbs are typically delivered without them.

The manufacturers need to have a greater understanding of the health implications to the workers who install their products. Manufacturers representatives believed simply reducing the weight of the concrete kerb below 25kg (the weight that bags of cement have been reduced on UK construction sites) will reduce the risks to the workers who install them. While the installers who were interviewed on various construction sites were more aware of the risks than expected (they knew that continuing with the work was detrimental to their health). This disparity between those who plan the work and those who carry it out has been confirmed in research into brick laying operations (van der Molen et al., 2004).

It was suggested in the design issues focus group that, in order for innovations to work, in the 'conservative' construction industry, a form of certification is required. This can be achieved by the British Board of Agrément (BBA) Certification, which is more suited to new innovations than the British Standards. They can also use a fast-track British Standard (The PAS system, publicly available standards).

Designers –

The approach that designers use to tackle the health implications of their design needs to change. This emphasis is supported by related work by Loughborough University (Gibb et al 2004). Some of the changes suggested by the focus groups were:-

- Designers need to appreciate the transfer from concept to detail on how the elements impact on one another.

- They should consider how much room is needed instead of saying how much room is available.
- They should review schemes for buildability and maintainability.
- It is important that they gain knowledge and understanding of the work to be done, hands on experience with the workers before doing the design work.

Clients/Local Authorities -

It was suggested in the design focus group meeting that Local Authorities need to review the planning concept and the adoption procedures to make sure they are up-to-date and relate to new technology and new methods of working. It was also remarked that the adoption of estate roads by Local Authorities was too strict in terms of damage to kerbs and increased the amount of kerb installation work. One suggestion was that the Local Authorities adopt the roads with the damaged kerbs as long as they are fit for purpose and then get recompense for the damage.

In the design focus group meeting the role of the clients was criticised. There was a lack of direction from clients with regard to safe work operation. If clients stipulated that mechanical aids must be used it would benefit the design of the work operations as all of the contractors would be pricing work on the same basis.

Contractors -

The view from the training focus group was that greater awareness of risks due to manual handling amongst workers required contractors to provide:-

- Manual handling refresher training at least every three years.
- Regular contact with trainers to reinforce manual handling training.

- Manual handling training at all levels of an organisation so that changes in work practices to remove manual handling risks received support.

The group felt that contractors had to ensure that users of new lifting equipment were given sufficient training and that the training should incorporate instruction from representatives of the lifting equipment manufacturers.

Training organisations –

At the focus group meeting to discuss training issues it was felt that training packages for kerb installation should include:-

- Specific but simple instruction on the use of lifting clamps.
- More detailed instruction on the use of lifting attachments to excavators for workers to achieve optimum speed of installation.
- At least half a day's training on the use of vacuum lifting equipment, preferably with someone who is aware of the equipment's shortfalls.
- Identification of risks in the installation process, such as the careful control of the concrete bed for the kerbs to reduce shovelling operations.

Enforcing bodies -

At the first focus group meeting it was agreed that any guidelines for the safe installation of kerbs should be different for new build and realignment/refurbishment work. The guidance needs to look at the whole risk, as the operation includes

hammering and shovelling tasks as well as the exposure to similar types of work as the workers are often required to do paving and drainage work.

However, the enforcement rationale was expressed by inspectors in the focus groups in that the HSE will impose enforcement :-

- where people are doing nothing to reduce the risk; or
- where they do not have mechanical aids or where they have them but do not use them.

Contractors appear not to know this. The HSE needs to ensure that what they require is understood by all those they require it from.

3.6 *Focus Group Exercises*

- Exercise - Mechanical lifting equipment

The group considered a number of alternative mechanical lifting devices. They examined various aspects (training, costs, other uses) of each piece of equipment before placing them in order of preference. The manual scissor clamps were poorly regarded in most aspects but required little training. The vacuum device attached to an excavator was thought of as inappropriate for general kerb laying operations but had many other uses available. The manually operated vacuum devices were considered most appropriate for kerb installation but required at least half a day's training.

Figure 4 - Here

- Exercise – Appropriate Design Solutions

In this exercise, the two groups worked out the appropriateness of concrete kerbs and their alternatives in each of six design situations. There was accord in the responses for the two groups for two or three alternatives for each situation.

- Exercise - Targeting the Training

This exercise led to the understanding that good manual handling training was of benefit to the workers but the benefits would not be realised without similar training being provided for the designers and supervisors.

Manual handling awareness training provided for designers was felt to be the most beneficial for the workers. It was felt that if the design is right that everything else will follow and that if the designers were aware of the problems in the kerb installation work that this would prompt ideas for improvements.

4.0 Discussion

Whilst we were fortunate to contact industry professionals with considerable experience, directly related to kerb installation, who kindly volunteered to attend the focus group meetings, we acknowledge that no kerb installers attended. However, we did carry out over 20 unstructured interviews of these workers on over ten separate sites to obtain their views and fed them into the focus group discussions.

Figure 5 - Here

The focus group said that designers had a lack of understanding of site practices which is in accord with Gambatese (2000) who said that designers need to know the potential hazards as well as means for mitigating the hazards. However, Anderson (2000) said that all that is required is that designers are told what is expected of them and how to achieve it and then be allowed to get on with it.

The innovation required is being held back by the conservative nature of the construction industry (Koningsveld and Van der Molen, 1997). The focus group for design issues stated this was the case especially with designers. A number of suggestions for manual handling awareness training for designers came from the training focus group where it was also emphasised that training should be carried out at all levels within the organisation. This was in agreement with research by Gervais (2003) which stated that training should be aimed at all construction project stakeholders.

The focus groups also commented on the resistance of workers to mechanisation, with a preference to use methods that required the use of their hands. In a study looking at the redesign of work for scaffolders (Vink et al, 1997) a participatory ergonomics approach was adopted. This required that workers be involved in the identification of the problems and development of ideas for improvement. We have noted in our site visits that workers have attempted to develop solutions (copying proprietary lifting clamps with their own modifications to size and shape; using plastic bands from

materials stacks as lifting straps) to make the task easier. These efforts should be coordinated with managers and supervisors to enable effective solutions to be developed that are understood and supported at all levels within the organisation.

The focus groups highlighted a number of alternatives to the manual handling of concrete kerbs and, the exercise carried out in the design focus group (see table 5) shows that none of these provide the answer in every situation. The alternatives include revision of concrete dimensions, kerbs produced from alternative materials and the use of lifting equipment. The lifting equipment changes the nature of the risk from load support to load management (Marras, 2000) since the devices may make the load virtually weightless but make it more difficult to control the inertial components of the load.

Conclusions

This work has confirmed results from other studies into construction practices such as pre-cast concrete manufacture and scaffolding as well as providing qualitative data containing practical solutions from industry professionals that could be developed with further research into general solutions for manual handling issues in construction.

At present changes in practices are not being controlled and resulting from enforcement rather than direct health concerns.

There must be a coordinated effort with all stakeholders in the industry to challenge the present conservative approach to the adoption of manual handling regulations. Ergonomics interventions in the workplace are likely to be most effective if they recognise both the individual and organisational readiness to change and target

information accordingly (Haslam 2002). The use of a participatory ergonomics approach to develop new solutions, as used in work with mechanical and electrical workers (Albers et al., 2004), with the workers should be adopted and the results disseminated throughout the industry.

Acknowledgements

Note: The research that formed the basis of this paper was funded by the Construction Health and Safety Group (CHSG). CHSG has provided safety training for the construction industry since 1952 when it started with a membership of 17 representatives from the major construction companies in London. With the membership now in excess of 500 companies it provides safety training courses on construction related subjects.



Figure 1



Figure 2

Figure 1 – Manual Handling of Concrete Kerb During Road Alterations

Figure 2 – Vacuum Lifting Device

Figure 3 - ACO Kerb-Drain Units

Figure 4 – Manual Lifting Clamps

Figure 5 – Manual Handling of Concrete Kerb for Car Park



Figure 3



Figure 4



Figure 5

Table 1 – Summary details of focus groups

	Topic	Exercise	No. in group	Date	Attendees included
1	Manufacture of concrete kerbs/lifting equipment	Lifting equipment	8	30/04/03	HSE inspectors, Ergonomists, Manufacturers, Safety Supervisors
2	Design issues	Fitting alternatives to design situations	10	21/08/03	HSE inspector, Highways Agency Engineer, Plastic Kerb Manufacturer, Local Authority Designers and Contractors
3	Training issues	How effective training is for different parties	6	23/09/03	Training instructors, Contractors and Safety Supervisors

Table 2 – Questions prepared for focus group meeting on manufacture and lifting equipment.

Question	
1	How have we arrived at using kerbs?
2	Can we change kerbs?
3	Is there an alternative to concrete kerbs?
4	Is lifting equipment the answer?
5	How should guidance be structured?

Table 3 – Questions prepared for focus group meeting on design matters.

Question	
1	How do you feel the design affects health and safety on site?
2	Does existing documentation restrict the design of highways?
3	What do you think about the state of communication between parties in the construction process?
4	Can the construction industry adopt alternatives where practices have been used for tens of years?
5	What should drive changes in construction to improve health and safety?
6	Would input from all parties concerned improve introduction of safer working practices?

Table 4 – Questions prepared for focus group meeting on training issues.

Question	
1	How much health awareness instruction is required in the training of kerb installation?
2	How big is the divide between training and practice?
3	Do we need to train construction workers differently?
4	With the increase in the use of mechanical lifters, do we need less training?
5	Assume that in five years time that mechanical lifters are excepted, who does the training?

Table 5 - Focus Group Exercise – Design Issues

	Housing estate	Car park	Trunk road	Minor rural road	City centre	Access or slip roads
Slip forming in concrete or asphalt	2	9	10	4	6	10
	5.5	8	9	6.5	2	No Score
Lighter kerb	10	10	10	10	10	10
	8	2.5	2.5	2.5	8	No Score
Combined drain/kerb	10	10	10	10	10	10
	4	2	8.5	8.5	2	10
Block paving incorporating kerb	10	10	0	0	10	0
	9	2.5	0	0.5	9	No Score
No kerb	0	10	10	5	0	4
	0	0.5	10	8	0	No Score
Concrete kerb	10	10	10	10	10	10
	7	8	0	8	7	0
Notes: Second Focus Group Meeting Exercise – Appropriate Design Score of 10 = Most Applicable Score of 0 = Least Applicable			Group A Scores Shown in Shaded Rows Group B Scores Shown in Rows With No Shading Scores in Bold indicate agreement between groups where different methods should be used			

Table 6 - Focus Group Exercise – Training Issues

Training intended for / Training issues	Which will have greatest effect on health of the workers	Reasons
Kerb Layers / How to lay kerbs and health implications of hammering, shovelling, manual handling etc...	<i>The worker gaining good appreciation of the 'manual handling' factor in each operation/tool/procedure. (Risk of Injury)</i>	<i>This won't happen unless supervisors trained. To achieve safe operation the major driver will be 'self-discipline' as supervision tends to be variable (in intensity)</i>
Designers / Effect of manual handling on kerb layers. Range of methods of kerb installation available – slip form, different materials, repair and not using kerbs at all	<i>Need understanding/ knowledge(practical hands on experience) of what is involved in actual installation</i>	<i>Avoid/reduce at source if possible. If design is right everything else will run from that. Will lead to awareness of the problems and prompt ideas for improvements</i>
Supervisors / Detailed look at main methods. Appropriate situation for using each. Health implications of each and brief look at full range of alternatives	<i>The supervisor to be aware of his role and responsibility and maintain standards and safety on site.</i>	<i>This is needed / essential as it will only happen if supervisors say so. Most supervisors believe it is not their responsibility. Has the wrong perception.</i>
Other	<i>To increase the understanding that resources, including Plant, Training and Innovation, are worth being made available.</i>	<i>If there is no technological progress, we will continue to chase our own tail.</i>
<p>Notes:</p> <p>Third Focus Group Meeting</p> <p>Exercise – Targeting the Training</p> <p>Focus Group Comments Shown in Italics</p>		

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