ABSTRACT
The construction industry is a dangerous business. Many safety initiatives have been implemented within the vocation, but for many years, health has been the ‘poor relative’ of safety in health and safety considerations. In order to understand how to tackle the growing epidemic of ill health, 25 health and safety directors were interviewed about their health management techniques and their acceptance of current practice in related industries. The methods of best practice which were acceptable, useable systems were assimilated and a health management process was developed in the form of a Toolkit package. This paper describes this development process of the health management system for the civil engineering sector and details the subsequent tools that were developed.

Keywords: Health, safety, construction management, culture, change.

1. INTRODUCTION
The construction industry is a perilous business and it is inevitable that failing safety issues that cause workplace deaths should reach the headlines. However, far less appreciated are the serious and widespread difficulties associated with work-related ill health. Ill health is a major problem for construction workers. It can affect an individual’s ability to work and have an impact on a person’s life, by affecting their health and well being. Very often there is a delay between exposure to hazardous materials and activities, and the onset of health problems.

Every year many thousands of construction workers suffer from work-related ill health. This is due to exposure to hazardous substances used such as asbestos, silica and cement, as well as exposure to manual handling activities, and noise and vibration in the working environment. Recent data illustrate these hazards; the UK’s self-reported work-related illness survey found an estimated 134,000 construction-related workers report a health problem caused by their work, resulting in an estimated 1.2 million days lost in a workforce of 1.5 million (Gibb, 2002). In particular there were 96,000 cases of musculoskeletal disorders; 15,000
cases of respiratory disease; 6,000 cases of skin disease and 5,000 cases of noise induced hearing loss. Hand arm vibration syndrome (HAVS) has also been identified as a health hazard as shown by recent research (Gibb, 2002). It should be noted that it is anticipated that these figures are a low estimate of health problems due to industry wide ignorance, under reporting and the delay between exposure and symptoms. In the UK, there is very little occupational ill health management in the construction sector, and where it is present, it is often basic and given low priority.

1.1 Aim of the study
The researchers were tasked to develop a toolkit for managing health within one area of UK construction: civil engineering. It was felt to be vital that the toolkit consist of practical guidance on simple management strategies for reducing the incidence of ill health amongst employees and sub-contractors. The toolkit was to be suitable for use in any contracting company, and to be made freely available as a resource to all those who could benefit in UK construction. It was suggested that the key components would include: the identification of main ill health effects of civil engineering activities; practical (but specific) actions that could be taken to reduce the incidence of selected ill health effects, including heath screening, case management, health surveillance etc.; formulation of realistic key performance indicators (KPIs) and monitoring arrangements (including standardised reporting arrangements, such as spreadsheets, proformas etc.), and; development of training materials as appropriate. At the same time, it was felt that a realistic baseline for current performance needed to be established and the liaison with other federations to seek common solutions was paramount. After these developments, it was anticipated that the material would be piloted with a range of civil engineering companies in order to trial and improve on the initial design and to create a full working model.

1.2 Potential benefits of the study
The principal benefit of the toolkit would be the establishment of meaningful occupational ill-health management arrangements for UK construction contractors. This would directly address one of the most difficult implementation issues facing the UK construction industry’s Revitalising Health and Safety in Construction programme. This ultimately would help drive the industry’s targets on reducing ill health amongst its workforce. The active management of health issues features heavily in the agendas of all the construction umbrella organisations, and in key initiatives, such as Accelerating Change and Rethinking Construction. Improving health and safety conditions in construction are also an essential component in helping to solve the industry’s retention and recruitment problems. Another potential benefit would be the reduction of Employers Liability Insurance premiums for contractors adopting the developed approach. Furthermore, it was anticipated that if such a tool could be developed for civil engineering, it could easily be used for the majority of the companies across the wider building and construction sector.
2. RESEARCH METHOD
In-depth interviews (n = 25) were conducted with civil engineering health and safety management from a variety of organisations, at locations across the UK. Each interview lasted approximately 2 hours. The interviews were conducted to identify main ill health effects, record baseline data, and understand the use of health related KPIs and monitoring arrangements. A selection of management from other major organisations in the wider construction sectors were also consulted (n = 15), in order to establish best practice from related disciplines. Analysis and development of the key themes was used to provide a framework for the toolkit. At each development, the interviewees were contacted and their opinions sought on the viability and relevance of the proposed design.

3. RESEARCH FINDINGS
Dialogue with health and safety management yielded useful feedback. After management interviews with contractors both large and small, with a diversity of specialties, 5 key health issues were identified as the main ill health effects within the civil engineering sector:

- hand arm vibration syndrome (HAVS)
- muscular problems
- dermatitis and hand injuries
- noise induced deafness
- respiratory problems

It was reported that there were a range of pro-health activities happening, with differing uptake and awareness amongst the sector, Table 1. From management responses, it was clear that health and safety were often treated as one and the same issue. This usually meant that the health aspect of “health and safety” management was given little emphasis or ignored.

A commonly reported barrier to health management was reported to be due to deficiency of knowledge and understanding of the health issues involved, including lack of understanding about the symptoms, causation and prevention. However the main reason for no positive action in the prevention of occupational ill health was reported to be the fact that managers and supervisors were uncertain how to manage and communicate the issues. It was reported that if individuals within organisations had a better understanding of what to do about managing ill health, then the “ball would slowly start rolling”.

It was recognised, however, that due to the current “health climate” and workplace culture, this change could take a generation to occur. It was deemed to be imperative that organisations should be seen to be proactive in managing ill health in the workplace, rather than reactive, as this may assist with culture change. Interestingly, in support of this, it was felt that a health management system does not have to be perfectly tailored for a specific organisation, rather that it should offer support and guidance on a number of different strategies, in order for employers to “hand pick” what suits them and their workforce best. Additionally,
it was believed by the large majority of management interviewees that feedback on newly implemented health management processes should be obtained from all levels of the workforce, requiring a focus on both top down and bottom up working practices.

These themes were presented to and discussed with other federations so that a joined up approach would lead to common solutions and consistency. Having considered the themes that emerged from the management consultation stage, and after reflection on information from other federations, a Toolkit was developed. The Toolkit is categorised into a series of steps to improve ill health and it is hoped that organisations will use the components as required.

Table 1: Health management strategies currently in operation within civil engineering organisations

<table>
<thead>
<tr>
<th>Task</th>
<th>Specific Company Actions</th>
</tr>
</thead>
</table>
| Prevent | Design out  
 | Prefabrication  
 | Lifestyle – e.g. blood pressure clinic, stop smoking help (embryonic stages) |
| Mitigate | Screening – records held by health care provider; review by occupational health staff  
 | Design out as far as possible with the use of method statements |
| Control | Induction – invite all new staff to come forward with any physical / mental health issues, e.g. diabetes / epilepsy so that leads to safer working  
 | Distribution of ‘hints’ cards to operatives on all aspects of health and safety |
| Train | Safety awareness training, including subcontractors and clients  
 | Tool box talks and other educational sessions. Some of these are run by high profile management figures to raise the awareness (attendance monitored) (health and safety tour) |
| | Safety alerts (of a topical nature)  
 | Health and safety quizzes (socials)  
 | Signs/symptoms group training (peer education)  
 | Videos and posters |
| Monitor | Remediation – the company pays out immediately so that it is looked upon more favourably and the incident investigated  
 | Design audits  
 | Analysis of accident books, leading to initiatives and changes  
 | KPIs - monitor accident/sickness/near miss records  
 | Workplace forums for information exchange and feedback |

3.1 Toolkit Components

The Toolkit was designed to assist supervisors and managers take the first steps forward with managing health issues. The specific components and the direct reasons for their inclusion in the Toolkit are described below:
Step 0 - Introduction to the Health Management Toolkit
This consists of background to the development, use and importance of the health management Toolkit in the form of an information sheet for management. An explanation is also offered regarding the various components of the Toolkit.

Step 1 - Ill health report form
Many cases of ill health can go unreported in the workplace, which can put the workforce at risk of suffering long term disabilities, health problems and reduced quality of life. Additionally, there is the risk of litigation against the employer and the reduced productivity and expense of rehabilitation that ill health can incur.

Therefore, it is important to manage any small health problems before they become uncontrollable and costly. It was felt that this could be done, to some extent, by collecting information on all health problems that are suffered in the workplace, investigating their cause, and improving the situation.

Step 1 consists of an ill health reporting system, for employees to use to report any incidences of ill health at work. It was firmly acknowledged by the individuals interviewed that a culture of proactive ill health reporting needs to be developed within the industry. Therefore, it was felt that the initial process implemented that would push towards a cultural reform in this respect, should be as simple as possible for the entire workforce involved. This was why it was decided that any (all) incidences of ill health at work should be reported. Examination of the proportion of work related ill health could be determined after initial data collection. It was flagged by interviewees that with any such agreement in the workplace, it is important to be aware of the level of trust that is required between the employees and employer with regard to honest reporting and use. The specific details of Step 1 are described below:

- Ill Health Report Form instructions - instructions for completion of the form.
- Ill Health Report Form cover page - information about who on site completed forms should be returned to.
- Ill Health Report Form - for employees to report any incidences of ill health at work. A form should be completed for any ill health suffered at work. This may include: aches and pains; colds and flu; work related and non-work related problems. A form should also be completed by individuals returning to work after any time off sick. (This form should be used along with the Site Accident Book.)
- Toolbox talk on Ill Health Report Forms - this educational aid is provided for managers/supervisors to inform workforce about the importance of completing Ill Health Report Forms.
- Crib sheet for Toolbox Talk on Ill Health Report Forms - For use by supervisors/managers when conducting Tool box talk.
- Ill Health Report Form: Documentation Record - used by managers to briefly document what the employer has done about any reported health issues arising from Ill Health Report Forms.
• Ill Health Report Form: Monthly Summary - Completed by managers/supervisors to briefly summarise the frequency and the types of health issues that have been reported by the workforce. This form is sent back (anonymously) to CECA so that the situation across the industry can be monitored.

Step 2 – Employee Health Questionnaire

Even small health complaints need to be managed before they become serious problems. As well as collecting information on health problems that may be suffered in the work place, it was felt important by interviewees that health problems that may exist from hobbies and activities from outside work, e.g. sport, DIY injuries, should be taken into account. It was acknowledged that such physical ailments should be closely monitored due to the impact that they can have on an employee’s ability to undertake the duties required in the workplace without compromising health and safety. Furthermore, it was felt strongly that attention needs to be given to employees’ previous work experiences and exposure to harmful substances and activities, as well as the employees’ own personal health, e.g. any health conditions that may be issues in the workplace, i.e. epilepsy, diabetes. Step 2 contains an Employee Health Questionnaire, used to monitor ill health amongst operatives, supervisors and managers. It is suggested in the guidance to this tool that a questionnaire should be completed by every employee within the organisation whenever their personal situation changes, and by every new employee when they join the organisation.

Step 2 consists of:

• How to use the Employee Health Questionnaire – information on when to use the questionnaire and what to do if ill health is reported.
• Employee Health Questionnaire - This questionnaire should be used to monitor ill health amongst operatives, supervisors and managers. It is suggested that a questionnaire should be completed by every employee within the organisation and by every new employee when they join the organisation. Additionally, it is suggested that a questionnaire should be re-completed by employees periodically, as and when required, e.g. every 12 months.
• Employee Health Questionnaire: Documentation Record - used to briefly document what employer has done about any reported health issues arising from Employee Health Questionnaires.
• Employee Health Questionnaire: Monthly Summary - Completed by employer to summarise frequency and types of health issues that have been reported by the workforce.

Step 3 – The GP Registration Process

It was reported by the interviewees that a secondary difficulty with managing occupational ill health is that if a health problem is reported by a member of the workforce, it is often difficult for referrals to medical practitioners to be made. This may be because an organisation is not large enough to be able to employ the
services of occupational health staff, and/or due to the transient nature of the workforce, many employees are not in contact with a GP and/or do not know where to go to seek help. Therefore, it was suggested that employees should be encouraged to improve their understanding about National Health Service provision, and to strengthen their relationship with their GPs (by registering in the first instance). In this way, these health professionals could be used as a first contact point for queries regarding individuals' occupational ill health as well as their general ill health.

‘Step 3, therefore, is an information pack for use by managers and supervisors to educate operatives about the importance of registering with a General Practitioner (GP). Whenever a current health problem is raised in the Employee Health Questionnaire (Step 2) or in the Ill Health Report Form (Step 1), the employee should be advised by their employer to have a consultation with their GP. A proforma letter is also available for the organisation to send to employees’ GPs to raise their awareness of the occupational health issues that may be an issue. Information on useful occupational health schemes that can benefit organisations, by keeping employees healthy and productive, are also detailed in this pack, and contact details and websites are available for all members of the workforce to use to find out more about how employers and employees could benefit from these initiatives.

Therefore, Step 3 consists of:

• Frequently asked questions about registering with a GP - for use by supervisors/management to respond to operatives’ queries.
• Toolbox talk about registering with a GP - for supervisors/managers to use with operatives to educate them about why and how they should register with a GP.
• Toolbox talk crib sheet for use by supervisors/managers when conducting Tool box talk.
• Information letter to GPs - proforma letter to be personalised and sent from the organisation (supervisors/management) to local GP practices where the workforce are/just about to be registered. This letter is designed to raise awareness about occupational health issues among GPs.
• Information on UK occupational health schemes that are currently running across the UK that can be used if applicable to your organisation.

Step 4 – Understanding the Key Health Issues
Another key barrier arising from the management interviews that was reported to prevent the improvement of occupational ill health, was that of lack of understanding: it was felt that many cases of ill health can go unreported in the workplace, due to low levels of operative education and subsequent lack of awareness. It was felt important, therefore, to ensure that all workers who may be exposed to hazards on the job understand how to prevent health problems from occurring and are able to recognise the early symptoms. This can be done, to some extent, by educating the entire workforce on the main health issues, including
prevention and the symptoms, as well as monitoring the health of operatives with ‘Self Health Checks’.

Step 4 consists of:

- Information on key health issues – for managers/supervisors to assist in training and raising the awareness of operatives. Educational documents were produced to highlight the key issues and latest facts and figures on: hand arm vibration; muscular pain, e.g. back ache, manual handling; dermatitis and hand injuries; noise and hearing loss; respiratory conditions. Having studied these, managers/supervisors will be able to perform the educational toolbox talks with for site operatives.

- Toolbox talks on Key Health Issues – These educational aids have been provided for managers/supervisors to inform workforce about the signs and symptoms of ill health, and to raise awareness for prevention, e.g. PPE, job design, specialised tools/equipment.

- Self Health Checks for Key Health Issues – these consist of self administered health checklists for uncovering symptoms, completed by site operatives. These checks should be undertaken after operatives have been educated on the health issues through the use of the tool box talks. The responses should be examined by the relevant supervisor or the organisation’s health professional(s). If an operative reports a positive response, they should either visit the site health professional (if applicable), or their GP, for further examination. Areas for assessment include: hand arm vibration; muscular pain, e.g. back ache, manual handling; dermatitis and hand injuries; noise and hearing loss; respiratory conditions. It is suggested that this checklist should be carried out by every new employee on the day that they start a job and be competed annually for each operative on site after the relevant TBT has been conducted by a supervisor/manager. Responses should be kept confidential and information is provided about how to store this information safely.

- Toolbox Talk Attendance Sheet - Records of attendance at tool box talks will be kept so that an organisation knows who is being educated in the issues. Reasons for non-attendance should also be disclosed so that the company knows, for future reference, if the employee could not or did not attend etc.

Step 5 - Information on health screening

Access to an occupational health service offers an organisation the opportunity to explore any concerns about the effect of the workplace on employees’ health. By advising a company on how to control hazards at work, an occupational health service will be able to make the workplace a safer place. There are many companies that offer occupational health screening. Some of the companies, along with their different types of screening and associated costs, are summarised in this section.
Therefore, the information in this section will be for managers/supervisors who may be thinking about health screening for their workforce. It will describe what health screening can consist of, the types of medical screening that are available from health care providers and the approximate costs involved. Contact details of health care providers will also be supplied.

Step 6 - Periodic updates

This information will be available to member companies as and when there are updates in the area of occupational health. This will include information about legislation, research findings and new equipment that has an impact on health. The information will be distributed in a user friendly format that can be applied easily to the workplace.

It is envisaged that information will be available for employees and employers with input from the Trade Unions, about what usually happens if a worker has a health problem. The information will be targeted at the range of individuals in the company. It is the intention that this material will be able to answer queries and concerns of the workforce regarding job security and health.

3.2 Future development of the Toolkit

During implementation of the Toolkit, the research team will be available as necessary to visit the organisation concerned to highlight the importance of the key issues, run through the Toolkit and to answer any questions about its use. It is predicted that it would be useful for representatives from several areas of the business to attend (as applicable) including: health and safety/senior management/directors, personnel/human resources management, site supervisors, health professionals, health and safety representatives, and union representatives. This is in order that the message about managing health is joined up throughout the organisation and that everyone understands their role in how to improve health.

It is anticipated that a member of the research team will contact each participating organisation during the initial year of toolbox implementation. This will initially be over the telephone or by email with visits to an organisation as required. This contact is to ‘troubleshoot’ any problems, to understand how the toolbox is working in practice, to continuously and iteratively improve it, and to ensure consistency and maintain engagement by participating organisations.

This contact should also assist with the (anonymous) performance monitoring, the compilation of periodic progress reports, the feedback of learning between CECA members, the assessment of supply chain response, and the maintenance of KPI data.

4. CONCLUSIONS

A model for health management has been developed based on interviews with health and safety management and the guidelines from other federations. The usefulness needs to be tested in the next phase of the development process which
will involve piloting the model and improving upon the design in an iterative process.

5. ACKNOWLEDGEMENTS
The authors wish to acknowledge the support of the Civil Engineering Contractors Association (CECA) who sponsored this research. The views expressed, however, are those of the authors and do not necessarily represent those of CECA.

6. REFERENCES
Total Quality Management is a method that can be used by the industry to improve the construction process. In a study led by Farad Shahbodaghlou and James Adrian of Bradley University (Peoria, Illinois) for the Illinois Department of Transportation (IDOT), a plan for how TQM could improve their department was developed. Shahbodaghlou and Adrian developed three key areas in which using TQM strategies could greatly improve the construction industry. The first issue in which TQM can help the construction industry is through customer relations. The construction industry does not focus on the details. Waste management is a key area of concern within the construction industry today. The following are tips for sustainable waste management in construction.

Some waste generated in the process of construction can be eliminated. For example, durable modular metal form systems for use in concrete construction may be selected on the basis of being readily demountable and reusable on other projects, thus eliminating wood waste associated with formwork fabricated of plywood and dimensional lumber. Elimination of waste can be beneficial to reduce impacts on human health and the environment. Demolition and deconstruction. Building demolition results in heavy pollution and waste generation, so deconstruction needs to be the focus instead.