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Perceived benefits of applying Pay for Safety Scheme (PFSS) in construction – A factor analysis approach

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ABSTRACT

In recent years, construction safety has been a hot topic in Hong Kong. The Government of the Hong Kong Special Administrative Region (HKSAR) has launched different safety measures to improve the prevailing safety performance of the construction industry. The Pay for Safety Scheme (PFSS) has emerged as one of the major safety initiatives launched within the public sector construction industry since 1996. It aims to encourage the safety awareness by taking the contractor's pricing for safety-related items out from the consideration of competitive bidding. The objective is to provide a concise review of the prevailing application of PFSS in Hong Kong in general, and to identify and analyse the key benefits of PFSS in construction through an industry-wide empirical questionnaire survey in particular. Altogether, 145 industrial practitioners who have derived extensive hands-on experience with the PFSS construction projects participated in the survey to indicate their levels of agreement to those 14 key benefits identified which were measured and analysed by factor analysis. The results of factor analysis indicated that the 14 individual benefits of implementing PFSS were consolidated under four underlying factors: (1) Enhancing safety climate and attitude; (2) Promoting effective safety-related communication; (3) Streamlining the safety procedures; and (4) Ensuring adequate safety training. A wider application of PFSS should be encouraged with a view to achieving better safety performance within the industry. It is recommended that a similar scheme to PFSS currently applied in Hong Kong may be developed for implementation in other regions or countries for international comparisons.

1. Introduction

The construction industry is characterised by continual changes, involving varying technologies, poor working conditions and the need for co-ordination of different interdependent trades and operations (Laukkanen, 1999). Due to the hazardous and complexity of work, safety is a serious problem within the construction industry (Tam et al., 2002). It is evident that the construction industry has recorded the highest rate of accident among various major industries in most parts of the world (Koehn et al., 1995; Sawacha et al., 1999; Ahmed et al., 2000; Wong and So, 2004; Choudhry and Fang, 2008). Stranks (1994) stated that the reasons for the poor safety record may correlate with many factors such as complexity of work or system, risk nature of work, management style, safety knowledge and commitment, and personal behaviour. In order to improve the current state of construction safety performance, different safety initiatives were implemented in both public and private sectors (Ng, 2007). In 1992, safety management system was first introduced in public works projects of Hong Kong. The Works Bureau promulgated the Independent Safety Audit Scheme and the Pay for Safety Scheme in 1996 to facilitate the application of efficient safety management systems and to improve the standard of safety performance. To promote safety awareness on construction sites, the HKSAR Government required her contractors to employ adequate safety officers and exercise proper safety measures such as safety plans, safety committees and safety audits.

An effective safety measure can substantially improve site safety performance because it can help the management to come up with safer means of operations and create safer working environment for the worker (Anton, 1989; Abdelhamid and Everett, 2000; Rowlinson, 2003). Furthermore, by incorporating effective safety measures, good safety culture can be fostered within organizations because it can encourage co-operation and communication between management and workers on different site safety operations. There has been a number of safety improvement measures developed within the construction industry of Hong Kong. It is crucial to unveil the actual benefits that are brought about by implementing these safety measures. This paper focuses on one of these safety measures, the Pay for Safety Scheme (PFSS) which is an effective safety incentive launched in the public sector by the government in 1996. The objectives of this paper are to review the current state of application of PFSS in Hong Kong in general, and

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identify potential benefits associated with adopting PFSS based on the findings of an empirical questionnaire survey in particular. The paper starts with a concise review of the overall safety performance of the construction industry and the current state of application of PFSS in Hong Kong. Then, the methodology of the research is described followed by the presentation and discussion of survey results. Finally, conclusions are drawn based on the research findings. The research outcomes of this study could provide some useful pointers to encourage a wider application of PFSS within the construction industry.

2. Literature review of safety theories and safety performance

It is now widely recognised that most of the industrial accidents are in some way attributable to human as well as technical factors in the sense that people might perform better to avert them (Lingard and Rowlinson, 2005). Humans have characteristics that can bring about accidental injury. For example, when people are not aware of the hazards associated with their work or underestimate the risks involved, unsafe behaviours or accidents may occur. Improving the safety performance by using technological solutions are not enough. Reason (1990) suggested that modern technology has advanced to the point at which improved safety can only be achieved through attention to human error mechanism. In the labour-intensive construction industry, human is particularly important and also fundamental to the process of constructing a structure. Thus, an in-depth understanding of the influences on human behaviours is critical to the success of safety management.

The objective of measuring safety performance is to provide a feedback mechanism that will foster improvement (Krause et al., 1990). The secondary functions are also very important, having to do with problem identification, preventive action, together with documentation and reinforcement of performance. The effectiveness of a feedback mechanism is directly dependent upon tapping the right sources of information in the first place. The most common management mistake about information sources is the reliance on accident frequency rate as sole indicators of safety performance (Krause et al., 1990). The inaccuracy of accident frequency numbers as the sole measure of safety performance is that an accident is an event, a discrete thing, whereas safety performance is an ongoing process. Furthermore, when accident frequency is viewed as though it were the sole measure of safety performance, it is a source of confusion and misguided effort (Krause et al., 1990).

Many modern safety approaches (e.g. Strickoff, 2000) advocated the use of proactive measures (e.g. safety climate, hazard identification and/or observed percentage of safe behaviours) that focus on current safety activities to ascertain system success rather than system failure. Krause et al. (1990) opined that an integrated approach which consists of gathering information, identifying problems, stimulating preventive actions, documenting safety efforts and reinforcing improvements in measuring safety performance, would be useful.

3. Construction site safety in Hong Kong

Hong Kong construction site safety is mainly governed by the Factories and Industrial Undertakings Ordinance (F&IUO), Chapter 59 and its subsidiary Regulations through the Labour Department. Prosecutions would be taken against any breach of the statutory provisions. Besides, the Hong Kong SAR Government has introduced a plethora of different safety initiatives in both the public and private sectors over the past decade. Most of the mandatory safety measures specified in the public works contracts are not enforceable in the private sector and some are being adopted on a voluntary basis. The significant improvement of the safety performance of the Hong Kong construction industry over the past decade indicated the profound effect of these safety measures. The downward trend of the accident rate is also supported by the statistics announced by the Labour Department (2009). As shown in Fig. 1, the accident rate of the Hong Kong construction industry has been declining in recent years from 1999 to 2008. When compared with 1999, it is encouraging to observe that the number of industrial accidents decreased from 14,078 in 1999 to 3033 in 2008, down by 78.5% and the accident rate per 1000 workers also dropped by 69.4% as well. The shape of the curve is convex to the origin. It is obvious that the decreasing rate of the number of accident is diminishing from 2003.

One of the possible reasons is that most of the safety initiatives (e.g. Pay for Safety Scheme (PFSS), Safety Management System (SMS), Independent Safety Auditing Scheme (ISAS) and Site Supervision Plan System (SSPS), etc.) were introduced by the government during the 1990s. As a start, these initiatives yielded some remarkable initial results in terms of reducing the number of industrial accidents. However, there are not many resources allocated for reviewing, refining and upgrading those schemes. The effectiveness of these safety initiatives is reduced as implementation details have not been regularly reviewed and properly refined in light of the prevailing changes of the construction industry throughout the past decade. To maintain this downward trend, it is necessary to review the existing safety initiatives for making further improvements.

4. Application of safety incentive schemes

There are various types of safety initiatives that companies utilize to promote site safety of workers; perhaps the most widely implemented type of programme involves safety incentives (Hinze and Gambatese, 2003). It has long been recognised that incentive schemes can improve company performance and motivate the workforce (Leichtling, 1997). Safety incentive scheme is one of the high-impact zero-accident techniques (Hinze and Wilson, 2000). According to Opfer (1998), safety incentive programs can be considered as psychological approach in which employees can be rewarded for safe work habits. Both LaBar (1997) and Laws (1996) expressed that safety incentive schemes are generally applied to reduce accidents, improve safety behaviours and safety-related records. Many organisations within the United Kingdom organise safety incentive schemes internally for improving safety performance of workers (Krause, 1998). Typically, some tangible "prizes" (e.g. bonus, prize, gift, coupon, etc.) were awarded to individual employees or contractors under safety incentive scheme. Tangible rewards can be powerful motivators of safety performance (Austin et al., 1996).

Geller (1999) supported that the implementation of safety incentives may provide positive outcomes. This is reinforced by two empirical research findings. The research conducted by McAfee and Winn (1989) indicated that "every study without exception, found that incentives enhanced safety and/or reduced accidents in the workplace, at least in the short term". Another study by Simonet and Wilde (1997) opined that safety incentives bring about desirable safety performance. Sims (2002) and Toft (2006) identified 10 categories of incentives: (1) recognition; (2) time off; (3) stock ownership; (4) special assignments; (5) advancement; (6) increased autonomy; (7) training and education; (8) social gatherings; (9) prizes; and (10) money. Gambatese (2004) divided safety incentive programmes into three types, namely, outcome-based, behaviour-based and activity-based. Under the activity-based approach, employees are rewarded when