IS THERE A CORRELATION BETWEEN CONTRACTOR'S HEALTH AND SAFETY PERFORMANCE AND THEIR PROFIT MARGIN?

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This paper analyses the relationship of on-site health and safety performance and the anticipated profit margin. It reports on the main findings of the research which includes the analysis of historical safety records of 22 construction projects and their profit margins. A scoring system was adapted to measure performance and profit. Analysis of the results indicates that the better the health and safety score of a project the more profit that project is likely to make and *vice versa*. In short, projects that recorded safety incidents during construction have also made a loss in their profit margins as a result of fall in productivity, disruption and penalties.

Keywords: Health and Safety, construction project, performance, productivity, profit.

1 Introduction

The Health and Safety Executive has, for many years, sought to promote a business case for health and safety management, including highlighting the downside costs of poor management such as lost time, lost productivity, fines as well as the business benefits, such as increased profits. Better H&S may help reduce accidents causing damage to equipment, machinery and raw materials and reduce work-related absence. This in turn may lead to an increase in output to firms and thereby lead to higher output in the economy. It can be argued that safer work conditions and healthier workers may increase the productivity of labor hours and thereby contribute to higher productivity and output. This strategy is pursued in part by businesses as they believe better Health and Safety will benefit their businesses (Wright *et al.* 2000).

Wright *et al.* (2005) states that 'evidence that good health and safety improves productivity' is the top ranked incentive for improving health and safety. It is further reported by Shearn (2005) that 10% of UK businesses will be prepared to increase their effort in H&S management, if they are provided with evidence that it would result in 'business benefits'. These benefits included a mix of both tangible and intangible benefits, such as maintenance of reputation, Client requirements, controlling insurance premium costs, reduction in absence rates as well as general improvements in health and safety. To compound this point, research by McCon (1997) has suggested that in firms that have demonstrated good, sustained safety performance, you will usually find the added benefits of good housekeeping, good product quality and high morale.

Improving health and safety is an integral part of the overall business management. However, despite the many ethical and moral reasons to invest in health and safety, organizations seem motivated to improve aspects of health and safety because of the potential risk to the business if this was not addressed. Although some organizations are convinced of carrying out health and safety initiatives, this tends to be driven by the need to manage costs (mainly insurance premiums) or by demands made by customers (to ensure they are eligible to participate in tendering processes, and also to maintain existing business), or by the risk of being non-compliant and the adverse effects this may have on the prospect of winning new business. It can be argued that it is better to present the financial benefits of health and safety initiatives in terms of reduction in absence rates, business interruption, labor turnover, higher productivity and quality. This in turn may change attitudes to health and safety, showing that it is not a compliance or staff welfare issue.

Unfortunately, to date evaluations of H&S activities have tended to focus on health and safety based performance metrics such as injury rates.

There has been less attention given to the economic contributions and impacts that health and safety may bring. There appears to have been few coordinated attempts to identify and assess the full spectrum of potential economic benefits and impacts (Smallman, 2001). Almost no scientific base was found for supporting the assertion that there is a business case for investment in health and safety, in other words, that such investment produces returns to stakeholders (Smallman, 2001).

The little evidence that exists is based largely around anecdote, which claims that excellence in health and safety does produce returns, and mainly from reduced insurance premiums (Smallman, 2001). Notwithstanding this, while the economic and moral cases for investment in health and safety are indisputable, the argument that ‘‘safety pays’’ frequently used by government is spurious, since:

“. . .any attempt to argue that safety pays must specify for whom. Unless we can identify a relevant decision maker for whom safety pays, the argument has no capacity to motivate action to reduce injury and illness” (Hopkins, 1999).

2 Aim and Methodology

It is the intention of paper is to show if there is a correlation between sites that perform well from a health and safety perspective and the final profit margin against the anticipated profit margin at the start of the project.

To achieve this aim, data from 22 construction projects was collected, in particular, 1) data Project information; 2) Procurement method; 3) Start & end date; 4) Actual completion date; 5) Contract Value; 6) Final account value; 7) Health and safety audits and scores; 8) Percentage of profit.

For each of the projects, the percentage increase or decrease of its final cost against its final value was calculated so that the percentage of profit could be analyzed. Health and safety audits were carried out on all projects every a month by either the Project Manager or the Surveyor of the individual project. In order to conduct the audit, each site is issued with a health and safety register and within the register there are 38 different sections covering a wide range of site specific tasks, requirements and statutory duties. Pertinent to the specific site, each site is audited once a month to check whether the tasks and duties as set in the register have been carried out.

The information garnered from the audit is then transferred to spreadsheet which monitors whether the site agent has been compliant or non-compliant with each of the section of the register.

3 Health and Safety Score

The health and safety score is perhaps, one of the most important headings, it gives the average score through-out the duration of the project. The score is calculated out of 100%, with 100% being the highest score possible. If a project scored 100% it could be concluded that it had performed brilliantly, throughout its duration. The following paragraphs explain how the score is calculated:

It was calculated by analyzing the monthly audits of the health and safety register. The H&S register comprises of 39 different sections which places a duty on the site agents to either check certain tasks have been completed or to ensure statutory guidelines have been adhered to. Once a month either the project manager or project surveyor will audit the register to check that the site agent has complied with the relevant sections pertinent to the project. The sections within the register include; 1) Site commencement; 2) Accident reporting; 3) Asbestos; 4) Cartridge tools; 5) Control of noise; 6) COSHH; 7) Demolition; 8) Electricity on site; 9) Excavation/groundwork; 10) False-work; 11) Fire prevention; 12) General H&S; 13) HFL &LPG; 14) Site visits; 15) Lifting operations; 16) Manual handling; 17) Permits to work; 18) PPE; 19) Piling; 20) Construction phase plan; 21) Risk assessment; 22) Road works; 23) Scaffold/work platforms; 24) Site induction; 25) Site instructions; 26) Site security; 27) Statutory records; 28) Steel fabrication; 29) Subcontractor safety; 30) Traffic management; 31) Training/toolbox talks; 32) Underground/over ground services; 33) Waste management; 34) Welfare; 35) Work equipment; 36) Working at high level; 37) Working in confined spaces; 38) Young persons; 39) Environment.

The project manager or surveyor filled out a report that highlights which sections have been complied with or have been non-compliant. This information was transferred to a monthly audit summary which plots each of the sections that the project have been non-compliant with.

This summary data was then extracted to a table which schedules out the complete duration of the project month by month. For every month a health and safety score was calculated by plotting the number of non-compliant sections out of 39. The amount of compliant section was then divided by 39 and multiplied by 100 to get a percentage out of 100.

4 Percentage of Profit

The percentage of profit made is the second most important heading as it gives the actual amount of profit the project made. This was done by calculating the difference in the actual cost against the final out turn value (Final Account sum) and dividing it into the cost and multiplying by 100 to get a percentage.

5 Results

Table 1 below gives a breakdown of the each of the projects final account amount, its out turn cost, its H&S score and the percentage of profit.

Table 1. Project values with Health & Safety Score and Profit Margin.

Proj	Final Account (£)	Out turn Cost (£)	H&S Score (%)	Profit (%)
1	346,039	295,176	90	17
2	403,450	420,000	100	-4
3	554,950	423,863	99	31
4	1,250,000	1,098,166	100	14
5	628,000	628,000	100	0
6	3,250,000	3,050,000	96	7

Table 1 (*Continued*)

7	4,152,000	2,875,000	98	44
8	1,148,864	1,062,446	99	8
9	260,212	243,716	99	7
10	1,675,428	1,675,428	89	0
11	190,018	152,515	99	25
12	6,885,812	5,900,000	79	17
13	2,375,012	2,300,000	96	3
14	6,000,000	3,500,000	99	71
15	2,945,431	2,471,812	96	19
16	765,057	837,842	52	-9
17	1,655,476	1,701,419	70	-3
18	449,054	445,000	81	1
19	1,675,428	1,650,428	88	2
20	2,951,619	3,179,997	91	-7
21	2,350,000	1,735,799	95	35
22	221,534	191,849	98	15

The results show that out of the twenty two projects, sixteen made a profit and they each had a health and safety scores higher than 70% with the average score being 95% and the average profit margin at 20%. Fourteen had an H&S score of higher than 95%, all but one made a loss. The average profit was 20%.

Amongst the sixteen projects that had an H&S safety score of 90% or higher, all but two projects made a profit. The average profit margin was 18%.

For the six non-profit making projects, their average H&S score was 84%. Amongst them, four projects made a loss with an average H&S score was 78%.

Overall, the average score was 92% with the average amount of profit at 13%.

Figure 1 shows the scatter plot of Profit on project (y) against H&S score (x). Regression analysis of profit margin on H&S score suggested that there is no significant linear relationship (R^2 = 0.1677, p>0.05). Instead, curvilinear regression analysis in SPSS revealed that profit best correlates with H&S score with R^2 = 0.4556 at p<0.001 in an exponential growth curve model with a plausible equation (1) of:

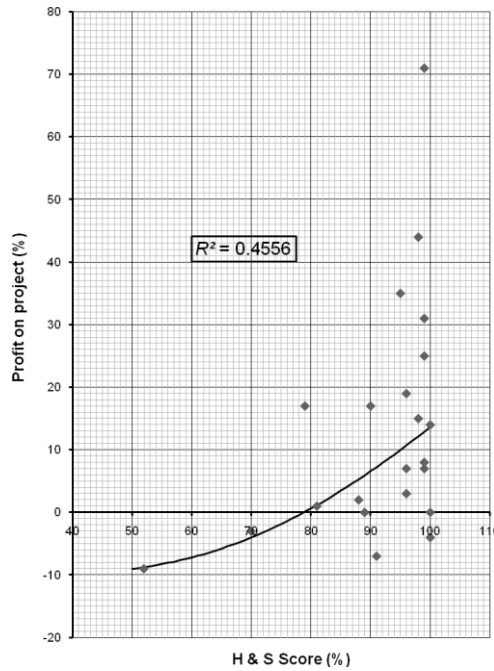

Figure 1. Results of curvilinear regression analysis.

$$y = e^{6.369 - \frac{320.703}{x}} - 10 \qquad (1)$$

6 Conclusions

Although projects with full H&S score did not all yield an overall profit, which suggests profitability depends of factors other than H&S management, projects that had a H&S sore of above 95% had an average profit margin of 20%. As the H&S score got lower so did the average corresponding amount of profit. It can therefore be concluded that the better the health and safety score of a project the more profit that project is likely to make. It can also be said that the worse performing sites, in terms of score, actually make less profit. The results show that there is a link that can be drawn between health and safety performance and profit.

The results also back up previous research and literature by the Health and Safety executive that suggested investing in

health and safety management can be a major contributor to business success.

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