

DECISIONS MADE ON CONSTRUCTION SITES

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The decision-making process is critical to the success of any construction project. Construction personnel have to make decisions on a daily basis and must be able to justify these decisions. Wrong decisions can be costly in terms of time, quality, cost and relationships. Effective time-management requires decisions to be assessed in terms of urgency and importance, and dealt with accordingly.

This paper discusses the results of a survey that was undertaken to investigate the characteristics of decisions taken on construction sites in Hong Kong. The results demonstrated that important decisions were mainly concerned with technical, engineering and financial aspects. Experience and knowledge were found to be the main contributing factors behind taking decisions. The results also revealed that one third of decisions were made within an hour and another 40 % were made on the same day. Most of the important decisions taken had produced satisfactory results but these could have been improved if more time had been available for collecting relevant information or acquiring experience. However, over 40 % of these decisions could have been avoided through adequate preparatory work such as a complete design, better co-ordination and better planning.

Keywords: construction sites, decision-making, Hong Kong.

INTRODUCTION

Previous research has tended to focus on developing or improving decision-making techniques (Russell 1992, Ashley 1983 and Wong 1995). However, the types and characteristics of decisions made by site staff have not been well documented. The decision-making process is an important part of the routine control of construction work, but can also be the result from incomplete planning, variations, poor site conditions or limited resources. Although most decisions are based on experience (Ashley 1983), the frequency of using other approaches on construction sites is not known. A study of decisions made on construction sites in Hong Kong was thus undertaken.

DECISION THEORY

Site personnel are constantly faced with many situations that require a decision and action to be taken within a very short period of time (Ashley 1983). Most of these actions do not require complex decision-making tools because organizations often have established rules and procedures, specifications and past records which determine the course of action to be taken. Some decisions, however, require experience or intuition as back up. If the required decision has impact beyond the scope of responsibility of the personnel concerned, advice or input should be sought from colleagues. Previous experience can be useful to solve simple problems, however, decisions support tools and techniques may have to be adopted when dealing

with complex problems involving numerous parameters in order to ensure that the best solution is adopted.

OBJECTIVES

The aims of the study discussed in this paper were to investigate:

- the types of decisions made on site in Hong Kong;
- the aids used by site staff in decision-making process; and
- the characteristics of important decisions recently made.

RESEARCH METHODOLOGY

After a review of the relevant literature, a questionnaire was designed to determine:

- the nature of respondent's employer;
- the respondent's post, discipline and working experience;
- the types of decisions generally made;
- the aids generally used when making decisions;
- the time taken to make recent important decisions;
- the feedback on recent decisions made; and
- the possibility of and means to eliminate the need for a decision to be taken.

Decisions are made at all levels on construction sites. Project managers make decisions that can impact on overall project schedule and cost. Site supervisors make decisions that influence operations directly under their supervision. The scope and magnitude of these decisions vary from level to level and are based on different types of experience and use a variety of decision support tools.

RESPONDENTS

In order to differentiate between the types and characteristics of decisions made at different levels, three groups of site personnel pursuing a part-time course in civil engineering or construction management were targeted.

- **Group 1:** 37 respondents with an average of 8.1 years experience. These students were Diploma or Certificate holders pursuing the Higher Certificate course in Civil Engineering. They were mainly employed as works supervisors or similar posts.
- **Group 2:** 77 respondents with an average of 10.9 years experience. Typical respondents were Technician Engineers who hold a Higher Diploma or Higher Certificate in Civil Engineering, and were studying for a Diploma in Construction Management.
- **Group 3:** 20 respondents with average of 8.8 years experience. These are engineers or construction-related professionals pursuing a Postgraduate Diploma or MSc in Construction Management. They have either a degree or a professional qualification.

After briefing, the questionnaires were completed. A total of 134 completed questionnaires were collected with a return rate of over 95 % in all groups.

Table 1: Nature of employer

Employer	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Contractor	12	32.4	43	55.8	14	73.7	69	51.9
Government	15	40.5	11	14.3	1	5.3	27	20.3
Consultant	9	24.3	8	10.4	1	5.3	18	13.5
Developer	1	2.7	12	15.6	3	15.8	16	12.0
Others	-	-	3	3.9	-	-	3	2.3
Total	37	100	77	100	19	100	133	100

Table 2: Current post

Post	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Project Man	-	-	14	18.7	8	42.1	22	16.8
Quant. Surv.	-	-	20	26.7	5	26.3	25	19.1
Site Agent	1	2.7	3	4.0	1	5.3	5	3.8
Engineer	-	-	9	12.0	2	10.5	11	8.4
Tech Officer	-	-	-	-	1	5.3	1	0.8
Site Supervisor	2	5.4	-	-	1	5.3	3	2.3
Clerk of Works	1	2.7	14	18.7	1	5.3	16	12.2
Inspector	1	2.7	3	4.0	-	-	4	3.1
Designer	-	-	3	4.0	-	-	3	2.3
Works Sup	24	64.9	5	6.7	-	-	29	22.1
Assistant Eng.	2	5.4	-	-	-	-	2	1.5
Technician	2	5.4	-	-	-	-	2	1.5
Production Ass	1	2.7	-	-	-	-	1	0.8
Co-ordinator	1	2.7	-	-	-	-	1	0.8
Survey Officer	1	2.7	-	-	-	-	1	0.8
Site Foreman	1	2.7	-	-	-	-	1	0.8
Others	-	-	4	5.3	-	-	4	3.1
Total	37	100	75	100	19	100	131	100

Table 3: Discipline of current post

Discipline	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Civil/Struct.	25	67.6	13	16.7	3	15	41	30.4
Building	9	24.3	35	44.9	12	60	56	41.5
Quant. Surv.	-	-	22	28.2	4	20	26	19.3
Architectural	-	-	5	6.4	-	-	5	3.7
Others	3	8.1	3	3.8	1	5	7	5.2
Total	37	100	78	100	20	100	135	100

RESULTS

Table 1 presents the nature of each respondent's employer. The respondents' jobs were mainly site based, consequently, half of them worked for contractors or sub-contractors.

Table 2 and Table 3 respectively present the post and discipline of respondents. Almost two-thirds of Group 1 were works supervisors. Group 2 were mainly technician engineers or equivalent. Group 3 were mainly engineers or professionals. All of the respondents were engaged in construction work.

Table 4 shows that: decisions taken by Group 1 were mainly technical or engineering related; Groups 2 and 3 involved more decisions relating to financial aspects; and decisions taken by Group 3 also involved personnel matters.

All three groups have similar frequencies of using experience and knowledge while making a decision (Table 5). The points worthy to note are that front-line supervisors

Table 4: Types of decision

Aspect	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Tech & Eng	31	96.7	38	56.7	8	40	77	64.7
Financial	1	3.1	25	37.3	8	40	34	28.6
Personnel	-	-	3	4.5	3	15	6	5.0
Others	-	-	1	1.5	1	5	2	1.7
Total	32	100	67	100	20	100	119	100

Table 5: Aids used in making decisions

Aid	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Experience	18	40.0	42	47.2	9	40.9	69	44.2
Knowledge	11	24.4	24	27.0	6	27.3	41	26.3
Advice	14	31.1	5	5.6	-	-	19	12.2
Past Records	2	4.4	8	9.0	4	18.2	14	9.0
Mangmt. Tech.	-	-	6	6.7	2	9.1	8	5.1
Intuition	-	-	4	4.5	1	4.5	5	3.2
Total	45	100	89	100	22	100	156	100

Table 6: Time taken to make a recent important decision

Time	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Instantly	16	44.4	-	-	-	-	-	-
One Hour	9	25%	18	23.7	3	15	46	34.8
Same Day	10	27.8	37	48.7	7	35	54	40.9
One Week	1	2.8	17	22.4	5	25	23	17.4
One Month	-	-	4	5.3	5	25	9	6.8
Total	36	100	76	100	20	100	132	100

tended to seek more for advice from their superiors (Group 1 - 31.1 % and Group 2 - 5.6 %) and the professionals tended to base more decisions on past records and management techniques.

Quick decisions are frequently required on site as delays can result in lost production or lead to claims by other parties. Table 6 shows that three quarters of decisions were made on the same day. As the works supervisors' job is related to the supervision of site operations, 97.2 % of their decisions were made on the same day and 44.4 % were made instantly. The professionals needed more time in arriving at a decision (25 % were made in the same week).

Table 7 and Table 8 summarise the quality of feedback on the decisions made. In general, the decisions were satisfactory except two cases (10 %) of professional decisions that had been assessed as bad by other companies. One third of the professionals' decisions were subject to external appraisal.

The decisions made could be improved by various means as shown in Table 9. Group 1 workers considered that increased experience could help improve the quality of the decisions they had made. Group 2 and the professionals considered that more information could be important. The professionals considered that better planning could have improve their decisions made and experience was not as influential as indicated by the other two groups. Table 10 illustrates the possibility of reducing the need for recent decisions and Table 11 summarises the means of reducing the need for recently made decisions.

Groups 1 and 2 considered that over 40 % of their decisions could have been avoided. More complete designs, improved co-ordination and better planning were considered the most effective means of reducing the need for some decisions.

Table 7: Feedback on decisions made

Feedback	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Very Good	1	2.8	2	2.6	-	-	3	2.3
Good	11	30.6	23	30.3	7	35	41	31.1
Satisfactory	24	66.7	51	67.1	11	55	86	65.2
Bad	-	-	-	-	2	10	2	1.5
Total	36	100	76	100	20	100	132	100

Table 8: Identity of feedback assessors

Assessors	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Same Comp.	30	93.8	58	75.3	14	66.7	102	78.5
Other Comp.	2	6.2	19	24.7	7	33.3	28	21.5
Total	32	100	77	100	21	100	130	100

Table 9: Improvement of decisions made

Means	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
More Experience	19	42.2	28	30.4	6	24	53	32.7
Better Training	10	22.2	8	8.7	3	12	21	13.0
More Information	10	22.2	40	43.5	9	36	59	36.4
Better Planning	5	11.1	13	14.1	7	28	25	15.4
Others	1	2.2	3	3.3	-	-	4	2.5
Total	45	100	92	100	25	100	162	100

Table 10: Possibility of reducing the need for recent decisions

Possibility	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Yes	15	44.1	37	48.7	6	30	58	44.6
No	19	55.9	39	51.3	14	70	72	55.4
Total	34	100	76	100	20	100	130	100

Table 11: The means to reducing the need for recent decisions

Means	Group 1		Group 2		Group 3		Total	
	No.	%	No.	%	No.	%	No.	%
Complete Design	8	33.3	21	43.8	4	40	33	40.2
Better Co-ordination	7	29.2	18	37.5	1	10	26	31.7
Better Planning	8	33.3	9	18.8	5	50	22	26.8
Better Weather	1	4.2	-	-	-	-	1	1.2
Total	24	100	48	100	10	100	82	100

DISCUSSION

Approximately half of the respondents worked for contractors or sub-contractors, 13.5 % worked for consultants and the rest were employed by government bodies or developers. The respondents held a variety of posts on construction sites, ranging from project manager to site supervisor.

Most of the decisions taken were generally of a technical or engineering nature (64.7 %). Financial decisions accounted for 28.6 %. Personnel decisions were relatively infrequent. The professionals needed to deal more with financial problems while front-line supervisors were concentrated on technical and engineering matters.

Experience (44.2 %) was considered to be the most dominant factor in making a site decision, followed by knowledge (26.3 %), advice (12.2 %) and past records (9 %). However, decisions were seldom based on management techniques.

Analysis of data revealed that 34.8 % of recent important decisions were made within one hour. Supervisors, in particular, often made instant decisions (44.4 %), because of their job nature. For the three groups, another 40.9 % had to be made on the same day. The professionals needed more time to arrive at a decision because of the scope of involvement required from others.

The importance of valuable feedback was demonstrated. Two thirds of decisions were rated satisfactory and less than one third was good. Very good decisions were few. Almost 80 % of the decisions were assessed by superiors from the same company. Two were ranked as bad by external assessors. In order to improve the quality of decisions taken 36.4 % of respondents required more data information and 32.7 % wished to acquire more experience. More than 40 % of recent important decisions could have been avoided by a more complete design (40.2 %), better co-ordination (31.7 %) and better planning (26.8 %).

CONCLUSIONS

This study has revealed that site staff had made decisions on technical, engineering and financial aspects. Front-line supervisory site staff mainly concentrated on technical matters and their decisions were made within a very short time and 44 % of their decisions were made instantly. The professionals needed more time to come to a decision including those of a financial nature. One quarter of their decisions were made in one week and another quarter were in one month. Experience (44 %) and knowledge (26 %) were dominant factors behind making decisions. Most of the important decisions made were satisfactory but nearly half of them could have been avoided by a number of means such as a complete design (40 %), better co-ordination (31 %) and better planning (26 %). If decision-making processes are to be improved, future developments in knowledge management must capture “experience”, “knowledge” and “internal procedures”. However, there still appears to be considerable work to be done in reducing the need for certain decisions as well than developing decision support tools.

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