

# Schedule Pressure in Construction Projects in Nepal

Prabhat K.C.<sup>1</sup>

<sup>1</sup>PhD Scholar| Mewar University, Rajasthan India

Kathford International College of Engineering and Management Balkurmari Lalitpur Nepal  
pkc@kathford.edu.np

## ABSTRACT

*Accelerating project can be rewarding. The consequences, however, can be troublesome if productivity and quality are sacrificed for the sake of accelerating the schedule. The trade-off among schedule pressure and its causes and effects are often overlooked when schedule decisions are being made. Altogether 68 respondents including owners, consultants, contractors, supervisors and workers were purposively selected from ten construction projects in Nepal. The perception level of schedule pressure and their agreement on twenty hypothesized statements were gathered for the study. Result shows that major drawbacks of schedule pressure are working out of sequence, generating defective works, wastage of materials, increasing construction costs, cutting corners, and losing the motivation to work; and thus generating claims and disputes. Adverse effects of schedule pressure can be minimized by scheduling construction activities realistically and planning them proactively, motivating workers, and establishing the effective project coordination and communication mechanism.*

Key words: acceleration, claims, disputes, productivity, schedule pressure.

## INTRODUCTION AND BACKGROUND

At the time of contract, the client, consultant and the contractor fix the project duration. Sometimes, the client, engineer or contractor may decide to accelerate the project by aggressively scheduling activities thereby allowing less time to complete each activity, which is known as schedule pressure. Acceleration is an effect of delay and acceleration occurs when (i) a contractor must complete its work faster than it had originally planned in the construction schedule; or (ii) despite excusable delay meriting an extension of time in the contract schedule, the owner requires the contractor to complete the construction as originally scheduled (Wilson, 2002). Disputes may arise over instructions to accelerate the work and such instructions to incorporate additional work without a corresponding time extension (Wideman, 1990).

Clients exert pressure on contractors by setting aggressive and always changing project objectives and target schedules in an effort to market their product. In other words, the owner pays for the construction on the hope of getting benefit from the project. If the project could be completed earlier than the schedule, then it would be more beneficial for the owner. Therefore, for getting more benefit, the owner always tries to complete the construction work before schedule. Sometimes, the project may get delayed either because of the default of the client or consultant or force majeure. To recover these types of delay, it is necessary to accelerate the project. Contractors can avoid delays by accelerating projects by means of, for example, adding resources, increasing the work hours/week and exerting schedule pressure on the staff consequently on workers. Firstly, the contractor tries to complete the construction work before schedule in order to minimize the indirect cost. Secondly, if the contractor completes the project after the completion date, he has to pay liquidated damages for delay. Similarly, sometimes, if the contractor completes the project before the completion date, the client has to pay extra money as a bonus/reward to the contractor. So, the contractor has always tendency to accelerate the schedule.

The objective of the study is to identify the relationship between schedule pressure and construction performance. The specific objective is to analyze the effects of schedule pressure on productivity, quality of work and workers' motivation.

## METHODS

A list of 10 construction projects in Nepal was identified. All the identified projects sites were visited and survey interviews were conducted with 6 owners, 14 consultants, 15 contractors, 9 supervisors and 24 workers. For the study of this work, purposive sampling was considered (Wolff & Pant, 2003). There were two parts in the query survey. In the first part, the perceived level of schedule

pressure of different stakeholders, in the projects they were involved, were asked. And, the aim of second part was to know the agreement of various such stakeholders on twenty hypothesized statements. The hypothesized statements are shown in table 2 to 7.

Perceived level of schedule pressure:

- Very Low : When the project is very ahead of schedule and given weight is 1.
- Low : When the project is ahead of schedule and given weight is 2.
- Normal : When the project is on schedule and given weight is 3.
- High : When the project is behind schedule or revision in the deadline to an earlier date is required and the weight given to this level is 4.
- Very High : When the project is very behind schedule or when the project duration is drastically reduced. The weight given to this level is 5.

The levels of schedule pressure were obtained from (i) owner, (ii) consultants, (iii) contractors, (iv) supervisors and (v) workers. Overall perceptions of schedule pressure were also obtained by adding the responses of all respondents. For the hypothesized statements, opinion of respondents were categorized from strongly disagree to strongly agree. The given weights to the opinions were from 1 to 5 respectively.

The collected data were analyzed (Panneerselvam, 2010) to find Arithmetic Mean (A.M.); Standard Deviation (S.D.); and Quartiles (First Quartile Q1, Second Quartile Q2/Median and Third Quartile Q3).

## RESULT AND DISCUSSION

### Level of Schedule Pressure Perceived by Respondents

Table 1 illustrates the level of schedule pressure perceived by the respondents in the projects, they were involved, at the time of this study. From the research study, it has come to be known that most of the owners work under high schedule pressure. Similarly, average consultants and contractors also work under high schedule pressure. However, the supervisors and workers work under normal schedule pressure. This could have been because of the deployment of additional resources by the contractors. Overall respondents worked under normal schedule pressure. This might have been because of consideration of higher numbers of workers and supervisors compared to other respondents. Normal schedule pressure is applied, when the project is on schedule.

Table 1: Level of Schedule Perceived by Respondents

Respondents	Particulars	Schedule Pressure					Total
		Very Low	Low	Normal	High	Very High	
<b>Owner</b>	Frequency	0	0	2	4	0	6
	Percent	0	0	33	67	0	100
	A.M.	3.67					
	S.D.	0.47					
	Quartiles	Q1= 3		Q2= 4		Q3= 4	
<b>Consultant</b>	Frequency	0	0	3	10	1	14
	Percent	0	0	21	72	7	100
	A.M.	3.86					
	S.D.	0.52					
	Owner	Q1= 3		Q2= 4		Q3= 4	
<b>Contractor</b>	Frequency	0	3	2	8	2	15
	Percent	0	20	13	53	14	100
	A.M.	3.6					
	S.D.	0.95					
	Quartiles	Q1= 4		Q2= 4		Q3= 4	
<b>Supervisor</b>	Frequency	0	0	6	3	0	9
	Percent	0	0	67	33	0	100
	A.M.	3.33					

	S.D.	0.47					
	Quartiles	Q1= 3		Q2= 3		Q3= 4	
<b>Worker</b>	Frequency	5	6	1	7	5	24
	Percent	21	25	4	29	21	100
	A.M.	3.04					
	S.D.	1.49					
	Quartiles	Q1= 2		Q2= 4		Q3= 4	
<b>Overall Respondents</b>	Frequency	5	9	14	32	8	68
	Percent	7	13	21	47	12	100
	A.M.	3.43					
	S.D.	1.09					
	Quartiles	Q1= 3		Q2= 4		Q3= 4	

**Analysis of Responses on Hypothesized Statements**

The analysis and findings of respondents on hypothesized statements are shown in table 2 to 7. From the findings, it can be said that average numbers of owners and contractors agreed that high schedule pressure decreased their workers’ productivity while supervisors, consultants and workers slightly agreed in this regard. Overall respondents slightly agreed with this statement. Overall respondents agreed that schedule pressure to a certain extent increased productivity. Most of the supervisors, contractors, consultants and workers suggested that if certain level of schedule pressure were applied to the project, it would increase productivity.

According to most of the respondents, very high schedule pressure generated more defects in a project. However, most of the respondents slightly agreed that workers cutting corners increased as schedule pressure increased. From their view, it was known that sometimes workers did cut corners to meet the deadlines when they felt pressure. Overall respondents agreed that workers lost motivation to work, if schedule pressure was applied on them. Most of the respondents partially agreed that high schedule pressure created rework. Sometimes high schedule pressure generated more defects in a project. To maintain the quality of work, the defects works had to be corrected or reworked.

Average respondents partially that high schedule pressure created lack of coordination and communication. Likewise, overall respondents partially agreed that schedule pressure decreased the pace of the completion time of the project. If high schedule pressure was applied, sometimes it might decrease the project duration. But, if rework had to be done in a project, the project duration might get increased. Overall respondents partially agreed that schedule pressure increased work rate. It might be agreed that the schedule pressure applied for short period could increase the work rate to finish certain activities.

*Table 2: Extent of Agreement and Analysis of Hypothesized Statements Responded by Owner*

Hypothesized Statement Responded by Owner	Extent of Agreement						A.M.	S.D.
	Strongly Disagree [1]	Disagree [2]	Slightly Agree [3]	Agree [4]	Strongly Agree [5]	Total		
High schedule pressure decreases workers’ productivity	0	1	0	3	2	6	4	1
Schedule pressure to a certain extent increases productivity	0	2	1	2	1	6	3.33	1.11
Very high schedule pressure generates more defects in a project	0	1	1	1	3	6	4	1.54
Workers’ cutting corners increases as schedule pressure increases	0	0	2	2	2	6	4	0.82
With greater schedule pressure workers loose motivation to work	0	1	2	1	2	6	3.67	1.11
High schedule pressure creates rework	0	0	1	2	3	6	4.33	0.75

High schedule pressure creates lack of co-ordination and communication	0	1	2	2	1	6	3.5	0.96
High schedule pressure decreases completion time of project	0	2	1	2	1	6	3.33	1.11
High Schedule pressure increases work rate	2	0	2	2	0	6	2.67	1.25
High schedule pressure increases workers income	0	2	0	2	2	6	3.67	1.25
Excessive schedule pressure affects team work of workers	0	0	4	1	1	6	3.5	0.76
Excessive schedule pressure increases overall cost of project	1	0	2	2	1	6	3.33	1.24
Excessive schedule pressure reduces safety of workers	1	2	1	0	2	6	3	1.53
Excessive schedule pressure increases workers absenteeism	1	2	0	3	0	6	2.83	1.21
High schedule pressure increases over timing of workers	0	1	2	1	2	6	3.67	1.11
High schedule pressure increases shifting of workers	0	0	1	1	4	6	4	1.15
Excessive schedule pressure needs over manning	0	0	1	4	1	6	4	0.56
Excessive schedule pressure increases wastage of construction materials	1	2	1	1	1	6	2.83	1.34
Excessive schedule pressure introduces fatigue	1	1	1	3	0	6	3	1.15
Excessive schedule pressure increases claims and disputes	2	0	1	0	3	6	3.33	1.8

Table 3: Extent of Agreement and Analysis of Hypothesized Statements Responded by Consultant

Hypothesized Statement Responded by Consultant	Extent of Agreement						A.M.	S.D.
	Strongly Disagree [1]	Disagree [2]	Slightly Agree [3]	Agree [4]	Strongly Agree [5]	Total		
High schedule pressure decreases workers' productivity	1	3	6	2	2	14	3.07	1.1
Schedule pressure to a certain extent increases productivity	0	1	4	8	1	14	3.64	0.72
Very high schedule pressure generates more defects in a project	0	2	5	5	2	14	3.5	0.91
Workers' cutting corners increases as schedule pressure increases	0	3	3	8	0	14	3.36	0.81
With greater schedule pressure workers loose motivation to work	0	2	2	7	3	14	3.79	0.94
High schedule pressure creates rework	1	2	5	4	2	14	3.29	1.1
High schedule pressure creates lack of co-ordination and communication	1	2	4	6	1	14	3.29	1.03
High schedule pressure decreases completion time of project	1	7	3	2	1	14	2.64	1.04
High Schedule pressure increases work rate	0	0	7	5	2	14	3.64	0.72
High schedule pressure increases workers income	1	2	5	5	1	14	3.21	1.01
Excessive schedule pressure affects team work of workers	0	3	5	6	0	14	3.21	0.77
Excessive schedule pressure increases overall cost of project	4	5	2	3	0	14	2.29	1.1

Excessive schedule pressure reduces safety of workers	0	4	8	1	1	14	2.93	0.8
Excessive schedule pressure increases workers absenteeism	1	6	3	4	0	14	2.71	0.96
High schedule pressure increases over timing of workers	0	3	2	5	4	14	3.71	1.1
High schedule pressure increases shifting of workers	0	3	2	5	4	14	3.71	1.1
Excessive schedule pressure needs over manning	0	1	3	9	1	14	3.71	0.7
Excessive schedule pressure increases wastage of construction materials	1	4	4	3	2	14	3.07	1.16
Excessive schedule pressure introduces fatigue	0	4	3	3	4	14	3.5	1.18
Excessive schedule pressure increases claims and disputes	2	4	2	5	1	14	2.93	1.22

Table 4: Extent of Agreement and Analysis of Hypothesized Statements Responded by Contractor

Hypothesized Statement Responded by Contractor	Extent of Agreement						A.M.	S.D.
	Strongly Disagree [1]	Disagree [2]	Slightly Agree [3]	Agree [4]	Strongly Agree [5]	Total		
High schedule pressure decreases workers' productivity	0	2	1	11	1	15	3.73	0.77
Schedule pressure to a certain extent increases productivity	0	1	1	6	7	15	4.27	0.85
Very high schedule pressure generates more defects in a project	0	1	5	6	3	15	3.73	0.85
Workers' cutting corners increases as schedule pressure increases	1	2	6	5	1	15	3.2	0.98
With greater schedule pressure workers loose motivation to work	0	3	1	8	3	15	3.73	1
High schedule pressure creates rework	0	2	4	6	3	15	3.67	0.94
High schedule pressure creates lack of co-ordination and communication	1	4	3	6	1	15	3.13	1.09
High schedule pressure decreases completion time of project	1	5	3	2	4	15	3.2	1.33
High Schedule pressure increases work rate	0	0	6	8	1	15	3.67	0.6
High schedule pressure increases workers income	3	6	1	5	0	15	2.53	1.15
Excessive schedule pressure affects team work of workers	1	3	3	7	1	15	3.27	1.06
Excessive schedule pressure increases overall cost of project	1	5	2	5	2	15	3.13	1.2
Excessive schedule pressure reduces safety of workers	0	5	3	5	2	15	3.27	1.06
Excessive schedule pressure increases workers absenteeism	1	5	2	4	3	15	3.2	1.28
High schedule pressure increases over timing of workers	1	0	3	10	1	15	3.67	0.87
High schedule pressure increases shifting of workers	0	2	5	8	0	15	3.4	0.71
Excessive schedule pressure needs over manning	1	0	4	9	1	15	3.6	0.88
Excessive schedule pressure increases wastage of	1	1	5	7	1	15	3.4	0.95

construction materials									
Excessive schedule pressure introduces fatigue	0	6	2	5	1	14	3.2	1.11	
Excessive schedule pressure increases claims and disputes	0	3	4	4	4	15	3.6	1.08	

Table 5: Extent of Agreement and Analysis of Hypothesized Statements Responded by Supervisor

Hypothesized Statement Responded by Supervisor	Extent of Agreement						Total	A.M.	S.D.
	Strongly Disagree [1]	Disagree [2]	Slightly Agree [3]	Agree [4]	Strongly Agree [5]				
High schedule pressure decreases workers' productivity	0	3	4	1	1	9	3	0.94	
Schedule pressure to a certain extent increases productivity	0	0	2	4	3	9	4.11	0.74	
Very high schedule pressure generates more defects in a project	1	3	1	2	2	9	3.11	1.37	
Workers' cutting corners increases as schedule pressure increases	1	3	4	1	0	9	2.56	0.83	
With greater schedule pressure workers loose motivation to work	0	2	3	3	1	9	3.33	0.94	
High schedule pressure creates rework	0	5	2	1	1	9	2.78	1.03	
High schedule pressure creates lack of co-ordination and communication	2	0	5	1	1	9	2.89	1.2	
High schedule pressure decreases completion time of project	0	2	2	4	1	9	3.44	0.96	
High Schedule pressure increases work rate	0	2	2	4	1	9	3.44	0.96	
High schedule pressure increases workers income	0	0	3	4	2	9	3.89	0.74	
Excessive schedule pressure affects team work of workers	0	3	2	2	2	9	3.33	1.15	
Excessive schedule pressure increases overall cost of project	0	2	3	2	2	9	3.44	1.07	
Excessive schedule pressure reduces safety of workers	0	0	5	0	4	9	3.89	0.99	
Excessive schedule pressure increases workers absenteeism	2	4	0	2	1	9	2.56	1.34	
High schedule pressure increases over timing of workers	0	1	3	2	3	9	3.78	1.03	
High schedule pressure increases shifting of workers	0	0	5	3	1	9	3.56	0.68	
Excessive schedule pressure needs over manning	0	0	3	4	2	9	3.89	0.74	
Excessive schedule pressure increases wastage of construction materials	0	3	1	5	0	9	3.22	0.92	
Excessive schedule pressure introduces fatigue	0	4	3	2	0	9	2.78	0.79	
Excessive schedule pressure increases claims and disputes	1	2	2	3	1	9	3.11	1.2	

Table 6: Extent of Agreement and Analysis of Hypothesized Statements Responded by Worker

Hypothesized Statement Responded by Worker	Extent of Agreement						A.M.	S.D.
	Strongly Disagree [1]	Disagree [2]	Slightly Agree [3]	Agree [4]	Strongly Agree [5]	Total		
High schedule pressure decreases workers' productivity	2	14	3	2	3	24	2.58	1.51
Schedule pressure to a certain extent increases productivity	0	5	3	14	2	24	3.54	0.91
Very high schedule pressure generates more defects in a project	1	5	4	8	6	24	3.54	1.9
Workers' cutting corners increases as schedule pressure increases	2	6	5	8	3	24	3.17	1.79
With greater schedule pressure workers loose motivation to work	2	5	5	10	2	24	3.21	1.12
High schedule pressure creates rework	0	7	4	9	4	24	3.42	1.08
High schedule pressure creates lack of co-ordination and communication	0	9	4	10	1	24	3.13	0.98
High schedule pressure decreases completion time of project	0	1	3	14	6	24	4.04	0.73
High Schedule pressure increases work rate	0	8	5	7	4	24	3.29	1.1
High schedule pressure increases workers income	0	7	2	10	5	24	3.54	1.12
Excessive schedule pressure affects team work of workers	1	5	3	14	1	24	3.38	0.99
Excessive schedule pressure increases overall cost of project	0	10	7	4	3	24	3	1.04
Excessive schedule pressure reduces safety of workers	0	5	4	7	8	24	3.75	1.27
Excessive schedule pressure increases workers absenteeism	0	13	2	6	3	24	2.96	1.14
High schedule pressure increases over timing of workers	0	2	5	13	4	24	3.79	0.82
High schedule pressure increases shifting of workers	0	9	2	12	1	24	3.21	1
Excessive schedule pressure needs over manning	0	3	2	13	6	24	3.92	0.91
Excessive schedule pressure increases wastage of construction materials	1	3	6	8	6	24	3.63	1.11
Excessive schedule pressure introduces fatigue	1	14	5	2	2	24	2.58	1
Excessive schedule pressure increases claims and disputes	1	6	6	10	1	24	3.17	0.99

Table 7: Extent of Agreement and Analysis of Hypothesized Statements Responded by Overall Respondents

Hypothesized Statement Responded by Overall Respondents	Extent of Agreement						A.M.	S.D.
	Strongly Disagree [1]	Disagree [2]	Slightly Agree [3]	Agree [4]	Strongly Agree [5]	Total		
High schedule pressure decreases workers productivity	3	23	14	19	9	68	3.12	1.14
Schedule pressure to a certain extent increases productivity	0	9	11	34	14	68	3.78	0.92

Very high schedule pressure generates more defects in a project	2	12	16	22	16	68	3.56	1.12
Workers cut corners increases as schedule pressure increases	4	14	20	24	6	68	3.21	1.05
With greater schedule pressure workers loose motivation to work	2	13	13	29	11	68	3.5	1.06
High schedule pressure creates rework	1	16	16	22	13	68	3.44	1.09
High schedule pressure creates miss co-ordination and communication lack	4	16	18	25	5	68	3.16	1.05
High schedule pressure decreases completion time of project	2	17	12	24	13	68	3.43	1.42
High Schedule pressure increases work rate	2	10	22	26	8	68	3.41	0.97
High schedule pressure increases workers income	4	17	11	26	10	68	3.31	1.17
Excessive schedule pressure affects team work of workers	2	14	17	30	5	68	3.32	0.98
Excessive schedule pressure increases overall cost of project	6	22	16	16	8	68	2.97	1.18
Excessive schedule pressure reduces safety of workers	1	16	21	13	17	68	3.43	1.14
Excessive schedule pressure increases workers absenteeism	5	30	7	19	7	68	2.9	1.19
High schedule pressure increases over timing of workers	1	7	15	31	14	68	3.74	0.95
High schedule pressure increases shifting of workers	0	14	15	29	10	68	3.47	0.98
Excessive schedule pressure needs over manning	1	4	13	39	11	68	3.81	0.83
Excessive schedule pressure increases wastage of construction materials	4	13	17	24	10	68	3.34	1.12
Excessive schedule pressure introduces fatigue	2	29	14	15	7	67	2.97	3.11
Excessive schedule pressure increases claims and disputes	3	23	14	19	9	68	3.12	1.14

Higher work rate was not achieved when schedule pressure was continued for a longer period. Overall respondents agreed that schedule pressure helped to increase the income of workers. When the workers perceived that time available to complete certain activities was insufficient but the imposition of time limit was obligatory, they experienced work pressure. They had to do overtime work which might increase their income.

Most of the respondents partially agreed that excessive schedule pressure affected teamwork of workers. Average consultants disagreed that excessive schedule pressure increased overall cost of the project. But, supervisors, contractors, owners and workers slightly agreed with this statement. Most of the respondents agreed that excessive schedule pressure reduced the safety of workers. Working under pressure might cause accidents. Therefore, it might be assumed that excessive schedule pressure reduced the safety of workers.

Excessive schedule pressure increased absenteeism. This statement was slightly agreed by overall respondents. Sometimes, when there was too much pressure, the expected performance might be difficult to achieve as a result of frustration and decreased human judgment. As a result, the workers lost motivation, which might increase workers absenteeism. Average respondents agreed that schedule pressure increased the time of workers, working shifts of workers and excessive schedule pressure needed over manning. Overall respondents slightly agreed that excessive schedule pressure increased wastage of construction materials. That excessive schedule pressure introduced fatigue; this statement was slightly agreed by average respondents. Overall respondents slightly agreed that excessive schedule pressure increased claims and disputes. Sometimes, there might be arguments among owners, consultants and contractors about the completion date of the project.

## CONCLUSION

The advantage of schedule pressure is that it increases the income of the workers. Another merit of the schedule pressure is, if appropriate amount is applied, it can increase the work rate. However, a higher work rate is not achievable when schedule pressure continues for a long period. If schedule pressure is applied to some extent, it may help to decrease the project duration. However, if rework has to be done, the project duration may get extended.

Very high schedule pressure decreases workers' productivity. When schedule pressure is too low, the performance is affected because of the lack of urgency or awareness. On the other hand, when there is too much pressure, the expected performance may be difficult to achieve. As a result, a number of events may occur: the workers may lose motivation to finish the work on time, they may try to cut corners, and they may perform their work out of sequence; which may cause rework. High schedule pressure creates lack of coordination and communication among the stakeholders in the project. Excessive schedule pressure affects team-work of the workers. It may also help to increase the overall cost of project. It reduces safety of workers and it increases workers absenteeism. Over timing, work shifting and over manning bring fatigue to workers and they may lose motivation to work.

An increase in schedule pressure may increase the number of work defects, thereby reducing the quality of works and increasing the wastage of construction materials. Because of increment in construction cost, wastage of materials and additional deployment of resources; the numbers of claims and disputes increase. If the schedule pressure deviates from the norms and values, the workers become less efficient. Therefore, it is assumed that there exists a certain level of schedule pressure at which the performance is optimum.

**Reference:**

- Jergeas, G. F., & Hartman, F. F. (1994). Contractor's Construction Claims Avoidance. *Journal of Construction Engineering and Management, ASCE, 120* (3), 553-560.
- Panneerselvam, R. (2010). *Research Methodology*. New Delhi, India: PHI Learning Private Limited.
- Wideman, R. M. (1990). Construction Claims: Identification, Communication & Record Keeping. *A paper presented to a TUNS/Revay Seminar*.
- Wilson, C. (2002). An Overview of Construction Claims: How They Arise and How to Avoid Them. *Longman Seminar for construction for Public Entities in British Columbia, Canada*.
- Wolff, H. K., & Pant, P. R. (2003). *Social Science Research and Thesis Writing* (3<sup>rd</sup> ed.). Kathmandu, Nepal: Buddha Academic Publishers & Distributor Pvt. Ltd.