



UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA

ESCUELA TÉCNICA SUPERIOR
DE INGENIEROS DE CAMINOS,
CANALES Y PUERTOS



APPENDIX 2. KEY FACTORS AFFECTING THE PRODUCTIVITY OF CRITICAL CONSTRUCTION TRADES

**Study on improving labor productivity in the construction
industry. The cases of Europe and Hong Kong.**

Titulación: Grado en Ingeniería Civil

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Key Factors Affecting the Productivity of Critical Construction Trades

QUESTIONNAIRE SURVEY

Section A – Introduction to the Questionnaire Survey

A.1 Background of this Survey

I am Ignacio ZABALLOS PALOP, an exchange student under the supervision of Prof. Xueqing (Eric) Zhang in the Department of Civil and Environmental Engineering, The Hong Kong University of Science and Technology. Our current research is focused on construction productivity. In our previous study, we had identified 15 critical construction trades for building and infrastructure projects in general, and 40 factors affecting construction productivity, which are classified into six groups.

Fifteen (15) Critical Construction Trades

1. Bar bender and fixer
2. Concrete and grouting worker
3. Rigger/metal formwork erector
4. Woodworker
5. Welder
6. Metal-steel worker
7. Scaffolder
8. Piling operative
9. Plant and equipment operator
10. Curtain wall and glass panes installer
11. Tunnel worker
12. Electrician
13. Prestressing operative
14. Blasting worker
15. Cement sand mortar worker

Six (6) Groups of Factors Affecting Construction Productivity

- I. Changes/errors in the original scope of work and the complexity of the work
- II. Poor resource plan and logistics
- III. Schedule changes and compression
- IV. Morale problems of workforce
- V. Qualification and communication problems
- VI. External factors

A.2 Aim of the Survey

In this questionnaire survey, we aim to identify the key factors (i.e., the most important ones out of the 40 factors mentioned above) that affect the 15 critical construction trades.

A.3 Completion and Return of the Questionnaire

This questionnaire takes about 20-30 minutes to complete. We would be very grateful if you could kindly participate in this survey and return the completed questionnaire to me by email at ignaciozaballos@gmail.com.

A.4 Confidentiality

All responses will be treated with the strictest confidentiality. If you have any questions about this survey, please feel free to contact me or my supervisor Prof. Xueqing (Eric) Zhang (zhangxq@ust.hk). Our postal address: Department of Civil and Environmental Engineering,

The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong.

Section B – Background of Respondents

Name(optional)

Organization(optional)

Email Address (optional)

Job/Position

Primary Area of Practice

Developer/client Estate/facilities manager Contractor
 Professional consultant Manufacturer/supplier Government employee
 Academic Others _____

Years of Experience

1-5 6-10 11-20 21 and above

Education Level

Dr. Master Bachelor High School

Others _____

Section C – Weightings of the Six Groups of Factors

Considering the relative importance of the six groups of factors affecting construction productivity, please assign a percentage weighting (%) to each of the six groups such that the sum of the weightings of the six groups is 100%.

No.	Factor Group	Weightings
1	Changes/errors in the original scope of work and the complexity of the work	
2	Poor resource plan and logistics	
3	Schedule changes and compression	
4	Morale problems of workforce	
5	Qualification and communication problems	
6	External factors	
Total		100%

Section D – Relative Importance of the 40 Factors

Please rate the relative importance of each of the 40 factors in terms of their individual impact on the productivity of the 15 critical construction trades, on a scale of 0-5 (with '0' being 'not applicable', '1' being 'low significant', '2' being 'fairly significant', '3' being 'significant', '4' being 'very significant' and '5' being 'extremely significant').

Fifteen (15) Critical construction trades: (1) Bar bender and fixer, (2) Concrete and grouting worker, (3) Rigger/metal formwork erector, (4) Woodworker, (5) Welder, (6) Metal-steel worker, (7) Scaffolder, (8) Piling operative, (9) Plant and equipment operator, (10) Curtain wall and glass panes installer, (11) Tunnel worker, (12) Electrician, (13) Prestressing operative, (14) Blasting worker, and (15) Cement sand mortar worker.

No.	Factor	Rating					
<u>I. Changes/errors in the original scope of work and the complexity of the work</u>							
1	Errors/omissions in specifications and quality requirements	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2	Unclear technical specifications	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
3	Design changes, errors and omissions	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
4	Design complexity	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
5	Additions to the original scope of work	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
6	Inappropriate construction method	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
7	Complexity of construction method	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<u>II. Poor resource plan and logistics</u>							
8	Material delivery problems	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
9	Unavailability of tools and equipment	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
10	Improper allocation of tools and equipment	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
11	Poor conditions of tools and equipment	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12	Improper crew size and composition	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
13	Overmanning	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
14	Idle time	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<u>III. Schedule changes and compression</u>							
15	Constrained construction site	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
16	Schedule acceleration	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
17	Overtime work	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
18	Rework	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
19	Multiple shifts	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
20	Schedule changes	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
21	Improper coordination between different construction trades	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<u>IV. Morale problems of workforce</u>							
22	Fatigue, mental and physical stress of workers	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
23	Worker absenteeism	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

No.	Factor	Rating					
24	Frequent worker turnover	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
25	Worker payment and compensation issues	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
26	Lack of incentives and respect for workers	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
27	Inconsistent rules of different supervision/management people	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
28	Inadequate safety measures	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<u>V. Qualification and communication problems</u>							
29	Shortage of skilled/experienced workers	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
30	Lack of training/orientation program for workers	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
31	Slow management decision process	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
32	Poor qualification/experience of management at different levels	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
33	Communication problems between management and workers	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
34	Language barriers	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<u>VI. External factors</u>							
35	Unfavorable economic and financial conditions	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
36	Unfavorable political environment	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
37	Social injustice and cultural conflicts	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
38	Labor shortage	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
39	Slow government approval process	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
40	Adverse weather	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

- END OF THE QUESTIONNAIRE -

Thank you for your kind support and valuable contribution to this questionnaire survey!