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1 Work-Life Balance for Construction Manual Workers

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4 ABSTRACT

5	The construction industry is facing acute labor shortage around the globe, which has caused an
6	escalation in construction costs and project delays. Work-life imbalance is identified as a major
7	detrimental factor in attracting young people to join the industry. Previous research on work-life
8	balance (WLB) has focused on shift workers, females, and managerial and professional individuals.
9	There is still a paucity of literature on WLB for manual workers, in particular, manual workers in the
10	construction industry. This paper aims to investigate how workers perceive their work-life balance
11	(WLB) and identify the factors that affect WLB in the construction industry. Based on interviews with
12	the chief executives and senior officers from key trade unions, a questionnaire survey was conducted
13	covering all types of construction manual workers including building, civil engineering and electrical
14	& mechanical (E&M) workers. A total of 970 valid answers were analyzed through Structural Equation

15 Model (SEM). The findings identified workplace support as the most critical area of concern.

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16	Additionally, work-life balance was found to have significant effects on perceived health and safety of
17	workers. The sample size of this study is so far the largest of its kind. This study helps us make
18	informed suggestions for improving work-life balance in the construction industry, and hence its
19	attractiveness to the younger generation to solve the labor aging and shortage problems.
20	Keywords work-life balance, construction workers, electrical and mechanical workers, labor shortage,
21	health and safety

22 INTRODUCTION

23	The construction industry is facing acute labor aging and shortage worldwide. The difficulty of
24	recruiting new blood aggravates the problem (Wong, F.K.W., 2018). Hong Kong has been facing
25	difficulties in recruiting young people into the industry. Young people in Hong Kong, as in other
26	countries around the globe, have become better educated and are offered wider choices of training
27	opportunities than the generations before them. They can afford to be selective in making their career
28	choice decisions. We need to understand what they want other than money. What we have found would
29	contribute to a better understanding of WLB of the construction industry, among young people in
30	particular. This would lead to the formulation of effective strategies and policies to attract them into the
31	industry, in Hong Kong as well as other economies facing similar problems.

32

33	The industry has not been able to recruit enough labor with the consequences of not only project
34	delays but escalating construction costs as well. Take Hong Kong for instance, the construction cost
35	here ranked the second highest in the world in 2017 (Arcadis 2017). Poor work-life balance (WLB) is
36	considered a critical problem that has made young people reluctant to join the industry. Tao et al. (2017)
37	revealed that the younger generation in Hong Kong would place more importance on their freedom
38	values. In addition, they may not be as ready as the older generations to pursue career goals at the
39	expense of their personal life. They were very concerned with the perceived lack of work-life balance
40	(WLB). In an international survey that assessed the working attitudes and economic awareness of
41	college students, Dunay et al. (2015) found that health, family and friends are the paramount factors in
42	the general system of values of the sampled students. Long work hour is a crucial disincentive to
43	choosing a job or career, whilst the opportunity to pursue personal life is a decisive motivator. The
44	enhancement of social image and WLB have generally been argued as principal measures to attract
45	manual workers to join the industry.
46	To attract the young generation to join the industry, there is a call for study in manual workers in
47	this particular area of WLB. Previous research on work-life balance (WLB) has focused on shift
48	workers, females, and managerial and professional individuals. Recent studies have turned their
49	interests more broadly to other population such as males and professionals that may not necessarily be
50	involved in shift work (Bahadur 2015; Raiden and Räisänen 2013). Lingard et al. (2012) studied WLB
51	of all employees, including white-collar and blue-collar workers in the construction industry in

52	Australia. There is, however, still a paucity of literature on WLB for manual workers, particularly in
53	the construction industry. Not even the report of the Construction Industry Review Committee (2001)
54	mentioned anything specifically on WLB in general and working hours in particular in their
55	comprehensive review of the Hong Kong construction industry. Furthermore, Fagan et al. (2012)
56	highlighted in a report from International Labour Organization (ILO) that, for the managerial and
57	professional level, there might be more control and resources in dealing with work-life conflict (WLC).
58	However, manual workers may not have such resources to offset the negative impact of WLC.
59	Therefore, there exists an urgent need for research in this area.
60	The objective of present study is to examine (i) how manual workers perceive their work-life
61	balance (WLB) and (ii) the factors that affect WLB in the construction industry. This study will find if
62	the factors identified in the literature are applicable to manual workers as well, and reveal those factors
63	that may be unique to construction workers in particular. A questionnaire survey was conducted
64	covering all types of construction manual workers including building, civil engineering and electrical
65	& mechanical (E&M) workers, based on the results from the interviews with the chief executives and
66	senior officers from key trade unions. It followed up with an examination of the issues of WLB as
67	perceived by construction workers themselves. A total of 970 valid questionnaires were analyzed
68	through Structural Equation Model (SEM).

69 LITERATURE REVIEW

70 Terminology of work-family balance

71	Different terms referring to "work-life" have been used in previous literature, e.g. work-family
72	balance, work-family conflict and work-life enrichment, etc. In a report from the International Labor
73	Office, Fagan et al. (2012) suggested that the most appropriate term is "work-personal life integration".
74	There are different terminologies of WLB, resulting from the different definitions of "fit" between
75	"work" and "life". The meaning of "fit" may differ among different people. WLB can be regarded as
76	"how one perceives whether it is balance between his/her work and life" (Greenhaus and Allen 2011).
77	Lingard and Francis (2004) revealed that site workers suffered from a higher level of work-to-life
78	conflict than office staff in the construction industry. The different availability of resources can also
79	cause large differences. The emphasis on different aspects of WLB has also changed over the years.
80	Research used to focus on "work-family" conflict rather than personal life outside the home (Byron
81	2005; Carlson et al. 2000). Today, more attention is paid to "personal" than "family". In our study, the
82	"life" in WLB is defined as all the personal life outside the workplace, including social life and leisure
83	time, in addition to family life. This research hence studied the integration and interaction between
84	work and personal life of the construction workers.

85 Changing Demands through Life

86	There are studies dealing with the issue of how demand changes as one goes through different
87	life passages and assumes different social roles. In the seventies, Atchley (1975) considered age an
88	important variable "that cuts across all areas of social life" through the three "social mechanisms": "the
89	life course, the system of age grading, and age-linked demands for decision making". Sheehy (1976), in
90	her bestseller, Passages, charted what she described as the "universal and inevitable passages" that we
91	all experience in our twenties, thirties, forties, and beyond. The book depicts the internal and external
92	forces acting on all of us, leading to the different demands we would exert through our different stages
93	of life. Perrone and Civiletto (2004) called the importance a person places on a work or family role the
94	"role salience", which determines their behavior in both work and family domains. Cinamon and Rich
95	(2002) suggested that those placing the work and family role equally important tend to be younger and
96	invest many hours in both roles. They would regard their success in life as one that is defined by both
97	work and family outcomes. People are aware of the potential conflict between work and family life.
98	Young people especially want to reduce the conflict and plan their lives accordingly. Spieler, et al.
99	(2018) also concluded that there is age differences in worker's perception of their job satisfaction and
100	hence their demand of work-life balance, based on a sample of employees of a German bank.
101	In the construction industry in particular, Siu, et al. (2002) found that older workers were more
102	satisfied with their jobs. They attributed this satisfaction to the recognition of fewer job opportunities
103	available for older workers, and hence they were more committed to work and compliance of safety

104	rules. The demands on work-life balance are thus different among the older and younger generations.
105	Francis, et al. (2006) conducted a qualitative study of work-life experiences in the public and private
106	sectors of the Australian construction industry. They found that organizational policies need to be
107	tailored to suit "the life stages of employers", because "employees of different ages and generations
108	experience different problems in balancing work and non-work life and have different preferences for
109	organizational work-life balance initiatives". Idress, et.al. (2017) studied psychological factors that
110	affect construction workers' perception on safety for two different age groups in Pakistan, one up to 35
111	years old and the other beyond. They identified different demands among different age groups.
112	Gyllered and Malmberg (2018) found that, in Sweden, "Generation Y perceives non-financial rewards
113	more important than financial rewards".
114	
115	Work-life balance and the construction industry
116	A balanced work-family life is particularly imperative in the construction sector, where poor and
117	deteriorating health, job stress, anxiety, and burnout are rampant (Francis and Lingard 2004). In
118	Canada, employees working on weekends and on non-standard work shifts reported higher "emotional

- 119 exhaustion, job stress and psychosomatic health problems" (Jamal 2004). Similarly, in Australia, the
- 120 construction workforce, who experience long working hours, suffer from stress and have enormously
- 121 high suicide mortality rates, which are approximately 75% higher than the overall average for male
- 122 workers (Siusan MacKenzie Equilibrium Worklife Solutions 2008). Lee et al. (2017) demonstrated that

123	long hour is significantly related to stress. Poor WLB not only associates with adverse health effects,
124	such as stress, anxiety, and even depression but is also related to fatigue (Fagan et al. 2012; Pisarski
125	and Barbour 2014). WLC is identified as one predictor for fatigue though overtime by itself does not
126	predict concurrent fatigue in shift workers (Pisarski and Barbour 2014). On the contrary, a positive
127	work-family balance may benefit not only employees but companies as well. Edmans (2012) identified
128	a relationship between job satisfaction and value to the firm. For the period between 1984 and 2011,
129	the annual stock returns of the firms listed in the "100 Best Companies to Work for in America" were
130	2.3% to 3.8% higher than the average (Edmans 2012). The increase in firm value comes from
131	employees' increase in productivity and satisfaction. Whereas, Allen (2001) indicated that less WLC
132	was associated with less job dissatisfaction, increased organizational commitment and reduction in
133	turnover intention. Moreover, a report from Health Canada highlighted that a healthy WLB can help to
134	improve productivity and reduce the financial cost of health care service related to WLC (Higgins et al.
135	2008). However, the relationship between WLB, work hour arrangement, health effects and safety still
136	need to be investigated further to reveal their interaction, in particular, for the manual workers in
137	construction sector.

Income and Its Inequality 138

139 Salaried and casual workers are paid monthly and daily wages respectively in the construction 140 industry. In addition, workers in various trades are paid differently. Moreover, people could be paid 141 differently by different contractors. This variety of incomes may be attributed to the different levels of

142	labor shortage and various physical demands in different trades. Income is a dimension of work
143	rewards, which can be associated with job satisfaction. Otherwise, as in the case of Nigeria, low level
144	of payments and lack of standard salary scales in skilled workers were identified as two of the most
145	critical causes for poor performance in the construction industry (Alhaji Ali et al. 2017).
146	Method of payment i.e. paid monthly or daily, reflects job security. Job insecurity and uncertainty
147	about career prospects are perceived as a concern for people to join/stay in the construction industry.
148	Chiang et al. (2015) conducted focus group meetings on construction personnel comprising casual
149	workers, temporary casual workers and salaried workers. Casual workers often resort to their
150	networking with contractors or subcontractors to get jobs from time to time. That leads to the
151	uncertainty of job continuity. Such job insecurity could reduce work performance, present anxiety as
152	well as work strain (Darvishmotevali et al. 2017). Lewis and Sloggett (1998) illustrated that
153	unemployment and job insecurity increase the risk of suicide. Ma et al. (2014) found that the link
154	between job insecurity and job satisfaction could partially be mediated by work-family conflict.
155	Perceived job insecurity could aggravate work-family conflict, which in turn could lead to more job
156	dissatisfaction
157	Thus, we included income as a variable in the study, and formulated the following hypothesis:

- 158 H1: Salaried work, in contrast to waged work, has positive impacts on WLB.

159 Long Work Hours and Weekend Work

160	Working long hours and on weekends are critical factors affecting the level of WLB. Long hours,
161	insufficient time with family and excessive workload were identified as the most crucial stressors felt
162	by Australian construction managers (Haynes and Love 2004). Moreover, the prevailing culture of long
163	hours of work, and the consequent work-family conflict were identified as barriers to women's success
164	in the construction industry (Watts 2009). Long working hours have been perceived as a major barrier
165	to achieving WLB (Turner et al. 2009). As Townsend et al. (2012) commented, "extended working
166	hours and the difficulty of balancing home and work are problematic for many employees", and "the
167	number of hours an employee works is a centrally important part of the work-life balance (WLB)
168	rhetoric". Wharton and Blair-Loy (2006) also reported that there is a clear inversely proportional
169	relationship between working hours and WLB. Additionally, a close link was found between long,
170	atypical and Saturday working hours and "family disintegration" (Relationships Forum Australia Inc
171	2007). In Victoria, Australia, Saturday work is "the biggest work and life balance problem" (Siusan
172	MacKenzie Equilibrium Worklife Solutions 2008). Thus, the average work hours per day and Saturday
173	work were included as variables in our study.

H2: Long work hours have negative impacts on WLB.

175 Organizational Support

176	Organizational support is identified as a facilitator that enhances WLB (Kumarasamy et al. 2015).
177	Likewise, organizational policy, culture and management support were perceived as positive factors of
178	WLB (Julien et al. 2011; Krishnakumar and Choudhury 2014; Lester 2015). Results from (Allen 2001)
179	indicated that "family-supportive organization perceptions" (FSOP) could mediate the relationship
180	between work-family conflict and organizational benefits such as job satisfaction, organizational
181	commitment, and decrease employees' intention to quit. Employees who perceived firm policy, welfare
182	and culture as more family-supportive would experience less work-family conflict. A supportive work
183	environment can help to increase WLB. Grandey et al. (2007) investigated the family-supportive work
184	environment on blue-collar people (in manufactory) and found that organizational support help to ease
185	the level of work-life conflict (WLC) in long-hour work.
186	Size of an organization may also affect the WLB. Robak et al. (2016) examined WLB factors in
187	the small and medium-sized enterprises (SMEs) and found that many features of SMEs may restrict the
188	resources for WLB support. This factor is particularly pertinent to the building industry as it is
189	dominated by small and medium contractors. In addition, Francis and Lingard (2004) found that
190	employees in the private construction sector experienced significantly higher levels of WLC than in the
191	public sector. They also confirmed that staff in the private sector suffered from longer work hours and
192	less work-related flexibility compared to those in the public sector. Employees in the public sector
193	showed higher work commitment and a lower turnover intention than those in the private sector.

194	Masuda et al. (2012) highlighted the cultural context and the improvement on WLB that could be made
195	through organizational support. Work arrangement is another important aspect of the organizational
196	factor. Work arrangements include work time arrangement and workplace arrangement (Masuda et al.
197	2012). Duxbury and Higgins (2009) suggested that employers could introduce flexible working
198	arrangements to increase employees' WLB. Likewise, it is reported that staff with perceived job
199	flexibility had better WLB under the same workload (Hill et al. 2001). ILO conducted a research on
200	working time and WLB. The report concluded seven variables, including age, gender, job strain,
201	household composition, work location, social class and infrastructures, that might affect the link
202	between work time arrangements and WLB (Fagan et al. 2012). These are important factors for the
203	construction industry to improve WLB.

204 H3: Perceived Workplace Support (WPS) has positive impacts on WLB.

205 **Poor Safety**

206 Construction work is highly risky and the industry infamous for its dismal safety records. The 207 construction industry accounts for 30–40% of the world's fatal incidents, but only around 7% of the 208 world's employment (Murie 2007). It ranks as top killer among industries globally. In 2015, 209 construction had the largest number of fatal injuries among all industries in the United States, Japan, 210 Singapore and Hong Kong (Japan Industrial Safety and Health Association (JISHA) 2017; Ministry of 211 Manpower (Singapore) 2016; Occupational Safety and Health Administration (United States 212 Department of Labor) 2017; The Labour Department 2016). Thus, site works demand high attention

213	and extreme focus. However, long hours of working with high focus is stressful and could cause
214	emotional exhaustion, which would further aggravate WLC. Wei et al. (2016) concluded that divers'
215	safety awareness could be jeopardized by strain-based work-to-family conflict. Moreover, perceived
216	poor safety has become a barrier to recruiting new blood in the industry (Chiang et al. 2015). Similar to
217	Canada (Alberta government 2007), monetary incentives are being offered in Hong Kong to attract
218	youngsters to undergo construction training courses but without much success. Instead, a safer site is
219	regarded as a more effective means to attract new recruits. Thus, perceived safety was included as a
220	variable in our research, and two hypotheses were formulated below.
221	H4: WLB has positive impacts on perceived workplace safety.

H5: WLB has positive impacts on the perceived health status of the worker.

223 METHODOLOGY

224 Participants and surveys

Interviews with the chief executives and senior officers from different workers' unions and associations were conducted to seek their opinions and to establish connections for subsequent data collection from construction workers. Consequently, the most representative four organizations were identified, which were Hong Kong Federation of Electrical and Mechanical Contractors (HKFEMC), The Federation of Hong Kong Electrical & Mechanical Industries Trade Unions (EMF), Hong Kong Construction Industry Employees General Union (under The Hong Kong Federation of Trade Unions),

231	Construction Site Workers General Union (under Hong Kong Confederation of Trade Unions,
232	HKCTU). In addition, the Nepalese Construction Workers Association in Hong Kong was contacted.
233	Local Chinese construction site workers mostly join one or more of the first four unions, whilst the
234	fifth one is for Nepalese workers, of whom most are locals and the remaining imported labor. In this
235	paper, the EMF workers are referred to as electrical and mechanical workers while all others general
236	workers.
237	Pilot studies were conducted after interviews with the workers' unions and associations to validate
238	the questionnaire. The questionnaires were then revised according to the suggestions from the
239	interviews and pilot studies. Data was collected between 1st September 2017 and 30th November 2017.
240	Questionnaires were distributed to workers during various gatherings such as Continuing Professional
241	Development programs (CPD), Green Card Courses, and annual gatherings. Questionnaires were also
242	sent by post to members of HKFEMC. Before distribution of questionnaires at each gathering, the
243	participants were briefed with the aims and details of the survey to solicit their support in completing
244	the questionnaires. Additionally, detailed explanations for each sections of questions were provided
245	during each of the survey sessions to ensure the full understanding for each question from participants.
246	The questionnaires were presented in English, Chinese and Nepalese to suit the need of each
247	participating audience. In terms of Nepalese participants, professional interpreters and industrial
248	helpers assisted the explanations and communication during surveying.

249 Measures

250	WLB, perceived WPS, perceived health and perceived safety were each assessed with a three-item
251	measure designed for this study. The three-item measure was used for simplicity since the
252	questionnaire was translated into different languages and the target audience were manual workers, of
253	whom most were educated up to high school level or below. Haar (2013) also used three-item measure
254	for similar studies on WLB. In the present study, WLB was assessed based on questions such as "My
255	personal life was affected by my work", "It was hard for me to deal with work and family", and "It was
256	hard for me to focus on my work due to distraction from my personal life". Perceived WPS was
257	assessed with questions such as "my employer cares about my welfare", "I get adequate information,
258	assistance and tools for carrying out my work at workplace", and "I am treated fairly by my
259	employer(s)". In addition, the study employed "stress", "tiredness" and "muscle pain" for evaluating
260	the status of participants' psychosomatic health. Perceived safety was assessed using questions such as
261	"It is safe working in my workplace", "Employer is committed to safety on site", and "Health and
262	safety are good in my work environment". Table 1 shows the questions employed in the survey. At last,
263	a total of twelve constructs were equally included in the four constructs of the final SEM model. Each
264	item under WLB, WPS and perceived safety was assessed using a five-point Linkert scale and coded 1
265	= "strongly disagree", and 5 = "strongly agree" for positively worded questions and vice versa for
266	negatively worded questions. Each item under perceived health was also assessed with a five-point
267	Linkert scale and coded 1 = "no", 2 = "slight", 3 = "moderate", 4 = "need medical treatment" and 5 =

268 "unbearable". The respondents' perceptions were assessed based on their experience in the last six
269 months.

270 Analysis

271	After data collection, an Exploratory Factor Analysis (EFA) was performed to identify the
272	characteristics of variables (Hair et al. 2006). Listwise method was employed to exclude the cases with
273	missing data. Principal Component Analysis was performed to extract factors and reduce the
274	dimension of the data. The result of Bartlett's Test is 0.946, indicating a good fit of factor analysis for
275	the assessed variables (Hair et al. 2006). A Confirmatory Factor Analysis (CFA) was then performed to
276	further assess the interrelationship between variables and factors. After further adjustments for the CFA,
277	"My personal life was affected by my work", "It was hard for me to deal with work and family", and
278	"It was hard for me to focus on my work due to distraction from my personal life" were identified to
279	measure WLB. "My employer cares about my welfare", "I get adequate information, assistance and
280	tools for carrying out my work at workplace", and "I am treated fairly by my employer(s)" assess the
281	Perceived WPS. "It is safe working in my workplace", "Employer is committed to safety on site", and
282	"Health and safety are good in my work environment" were identified to assess the perceived safety.
283	"Stress", "tiredness" and "muscle pain" were identified for evaluating the status of participants'
284	psychosomatic health.
285	The Structural Equation Model (SEM) seeks to explain relationships between multiple variables

286 (Hair et al. 2006). In order to explore the relationships between different variables, SEM and multiple

287	regression analysis can be adopted. The assessed variables may also affect each other, e.g. between
288	latent variables and/ or between independent variables. Though regression analysis can be utilized to
289	identify the causal relationship between variables, it cannot show the relationships between latent
290	variables and independent variables, and the relationship between different independent variables at a
291	same analysis. Hence, SEM was adopted in this study because it can test the relationship between
292	observed variables and latent variables. It also estimates a series of separate and interdependent
293	equations simultaneously through a structural model specified by the researcher but derived from
294	theory (Hair et al. 2006). It works as a combination of regression analysis, factor analysis and path
295	analysis. It can explore and analyze the relationships between both observed variables and latent
296	variables, and between observed variables at a same time. Thus, the present study employed SEM to
297	analyze the data to explore the comprehensive relationships between assessed variables. The model
298	was developed using three datasets; the dataset for the electrical and mechanical workers, the dataset
299	for the general workers and the dataset that combined both the electrical and mechanical workers as
300	well as general workers.

301 Measurement Model

The measurement model specifies the relationship between the constructs (defined variables that cannot be directly measured) and their corresponding indicators (observed variables used to measure each construct). In this study, the four constructs WPS, WLB, Safety and Health were measured using

three questionnaire items each.

306	Despite the widespread use of SEM, there is still no consensus with regards to which model fit
307	indices are acceptable as well as their respective cut-offs (Hooper et al. 2007). After a thorough review
308	of best practices, Hooper et al. (2007) suggested that amongst others, the Chi-squared statistics (X^2) and
309	its corresponding discount factor (df), Root Mean Square Error of Approximation (RMSEA),
310	Comparative Fit Index (CFI), as well as one parsimony fit index such as Parsimonious Comparative Fit
311	Index (PCFI), should be reported. In line with this suggestion, this study reported X^2 , df, Normed
312	Chi-Square (X^2/df), RMSEA, CFI and PCFI. Hair et al. (2006) and Iacobucci (2010) suggested a lower
313	limit of 1 and a higher limit of 3 for the X^2/df , though Hooper et al. (2007) suggested as high as 5. Hair
314	et al. (2006) and Hooper et al. (2007) agreed that the CFI should be 0.90 or higher and the RMSEA
315	should be below 0.10, although a value between 0.05 and 0.08 is better. However, both (Hair et al.
316	2006; Hooper et al. 2007) cautioned that a strict cutoff should not be applied to SEMs. Indeed,
317	Iacobucci (2010) asked researchers "not be overly critical if the CFI is not quite .95, or the SRMR not
318	quite .09". Rather, simpler models should have higher cut-offs while the cut-offs can be relaxed for
319	more complicated models. The PCFI, on the other hand, does not have a cut- off, the higher the value
320	the better the model.

321 **RESULTS**

322 General data

323	A total of 970 valid questionnaires were collected during the period. The sample size is much
324	larger than what is suggested by Iacobucci (2010), which recommends "a sample size of at least 50".
325	Out of this, 547 were electrical and mechanical workers while 423 were general workers. 28% of the
326	general workers were salaried workers compared with 51% for electrical and mechanical workers. Also,
327	the level of education for electrical and mechanical workers is relatively higher with 14% of the
328	respondents having an associate degree and above, compared to 9% for general workers. The general
329	workers reported longer average working hours per day (Figure 1). In addition, 88% of general workers
330	had worked on Saturdays, comparing with 85% of electrical and mechanical workers. Despite working
331	longer, the general workers earned just as much as their electrical and mechanical counterparts. About
332	19% of both of them earned HK\$30,000 and above.
333	Figure 1: Average Work Hours of Electrical and mechanical Versus General Workers

334 Structural Model

- A reliability test using Cronbach Alpha was conducted for each construct and all were above 0.75
- 336 (Table 2), signifying good reliability. The structural model is presented in Figure 2, where the
- 337 rectangular boxes are for variables that could be measured directly while elliptical ones are for

- 338 variables that were measured by series of other measured variables. In this case they were each
- 339 measured by three item Linkert scale questions.
- 340 Figure 2: Structural Model
- 341 The result of the model fit indices for the measurement model as presented in Table 3 indicates
- 342 that all three models have an acceptable fit though, the χ^2/df for electrical and mechanical workers is
- 343 slightly below the threshold. The standardized regression estimates (Table 4) also reveal that the three
- 344 indicators for each construct are statistically significant.
- 345 The structural model measures the relationship between the constructs. It specifies which variables

346 influence the others in the model both directly and indirectly. Therefore, it is used to test the underlying

- 347 hypothesis. The structural model was evaluated using the same model fit measures used in evaluating
- 348 the measurement models. The results revealed that the models using the dataset for all workers and the
- 349 dataset for electrical and mechanical workers have acceptable fit as all model fit indices reported are

350 within the acceptable level (see Table 5). On the other hand, the model using the dataset for the general

- 351 workers has a CFI of 0.88, which is marginally below the suggested level of 0.90. However, the other
- 352 model fit indices are within the acceptable threshold. It is plausible to believe that most of the general

353 workers receive daily wages rather than monthly salary and are therefore not very concerned about

- 354 WLB. Rather, they place more emphasis on income, so they tend to work longer. Hence the model fit
- 355 based on general workers is marginally not as good as that based on electrical and mechanical workers
- and all workers.

357	The hypotheses stated earlier were tested using the structural model and the result is presented in
358	Table 6. The regression coefficients for H1 are statistically insignificant for the three datasets. Hence,
359	the method of payment (salary or wages) has no significant effect on WLB in this study. H2 for general
360	workers and all workers is statistically significant. The relationship between work hours per day and
361	perceived WLB was negative, signifying that the longer these set of workers work the worse their
362	perceived WLB is. However, for the electrical and mechanical workers, H2 is not statistically
363	significant. The regression coefficients for H3 were positive and statistically significant for all workers
364	and electrical and mechanical workers while it is statistically insignificant for the general workers. The
365	regression coefficients for H4 and H5 are positive and significant for the three datasets.

366 Views of Union Representatives

- 367 A brief report of the initial interviews conducted with the representatives of the various unions is
- 368 presented in Table 7. The findings from the surveys of the workers are expectedly in line with what
- their representatives have said.

370 **DISCUSSION**

- 371 The results of regression coefficients for H1 indicates that the method of payment (salary/wages)
- 372 has no significant effect on WLB. Alhaji Ali et al. (2017) found that level of wage may be one
- indicator of performance. The present study assessed the stability rather than the magnitude of payment.
- 374 This may indicate that further research should look at the relationship between level of wage and WLB.

375	Regarding H2 for general workers and all workers, the relationship is significantly negative. It
376	indicates that for all general workers, the long hour of work is associated with poor work-life balance.
377	Whereas, for the electrical and mechanical workers only, the negative relationship is not statistically
378	significant. Electrical and mechanical workers tend to work fewer hours per day. Hence, work hours
379	have no significant effect on perceived WLB. Additionally, about 47% of the Electrical and mechanical
380	workers in our analysis were above 50 years old compared with 39% for general workers. We can,
381	therefore, conclude that they were already used to working long hours, hence there was no effect on
382	their perceived WLB. Twenge et al. (2010) also found that older generations are more used to working
383	long hours and are thus less likely to pursue leisure.
384	The results for H3 indicate that WPS has a significant effect on WLB in the cases of all workers
385	and only electrical and mechanical workers. General workers tend to place less value on workplace
386	support compared with their electrical and mechanical counterparts. It is not unexpected as the majority
387	of general workers earn daily wages and they have to be prepared to switch between employers. They
388	do not have the luxury of staying with one employer for long. Otherwise, when the workers
389	contemplate a longer relationship with their employers, they do expect to have some WPS to enhance
390	their WLB. Previous studies (Banu 2016; Jang 2009) also found that perceived WPS has a positive
391	effect on WLB. Hence, to improve WLB of construction workers, emphasis should be placed on WPS,
392	and organizations should put policies in place that would cultivate workers' trust in their employer.
393	Also, policies that would encourage teamwork and increase workers' sense of belonging should be

394 promoted. This could be done even if the employer-employee relationship is ad-hoc and temporary. As

the following paragraph shows, even for general workers, WLB leads to both perceived safety and

396 good health.

397 The regression coefficients for H4 and H5 are significant for all datasets. This signifies that WLB 398 has positive effects on perceived workplace safety and perceived good health. Safety and health are 399 reported to be main issues to be considered when addressing Hong Kong's construction industry skill 400 shortage (Ho 2016). The result of this study reinforces this. It shows that when workers are better able 401 to manage work and life responsibilities, they are also better able to manage their health and stay safe 402 at work, at least this is what they think. 403 Similar to the survey findings, results from the interviews reveal that the general workers work 404 longer than electrical and mechanical workers. The general workers work overtime mainly to earn 405 more, while electrical and mechanical workers do so mainly due to the nature of their job. They all 406 agreed that the pay is reasonable and that the image of the construction industry is fair (it was ranked 407 an average of 5.25 on a scale of 1-10). Poor work environment, long work hours, poor safety 408 performance, job insecurity as well as the low social status of construction industry jobs are the main 409 factors identified as discouraging the younger generation from joining the construction industry. 410 Suggestions for attracting younger generation are mainly about WPS such as increased training, 411 increased job stability, increased use of technology, improved workplace facilities and increased safety 412 measures. Other suggestions relate to policy changes such as incorporation of practical skills needed in 413 the construction industry into the training system, as well as enlightening high school students on the

414 construction industry.

415 Limitation and future research

416	One limitation of the study is that the data is self-reported. In addition, the data is skewed towards
417	workers that are over 50 years of age, the dominant age group in the industry. However, it is the
418	perceptions we aimed at measuring and in reality, the workforce is aging. Future studies may target the
419	students, apprentices and the young workers in particular to understand their perceptions of WLB. As
420	aforementioned, there are demand changes through life. The variables "age" and "number of children"
421	are tested in a preliminary SEM to assess if people of different ages and if people with different
422	number of children to raise have different perceptions on work-life balance. It is identified that "age"
423	and "number of children" have impacts on perceived work-life balance. However, the two variables
424	were excluded from the final CFA and SEM process due to poor model fit, suggesting that there is not
425	enough statistical significance for the overall model. Furthermore, these two variables are not the prime
426	objective of this study. Thus, such issues should be re-visited in future studies when there are larger
427	dataset to control for individual differences. Moreover, future research should look at different
428	occupations of manual workers from different regions to examine the effects of WLB.

24

429 CONCLUSION

430	This study examined the issues of WLB as perceived by construction workers themselves. Method
431	of payment was found not to have a significant effect on WLB. Contrarily, work hours have significant
432	effects on WLB when in both cases of all workers and general workers. Alternatively, WPS was found
433	to have a significant effect on WLB when all workers and only electrical and mechanical workers are
434	considered. WLB has positive effects on perceived workplace safety and perceived good health for all
435	workers. Hence, to improve WLB of construction workers, emphasis should be placed on WPS.
436	Organizations should ensure that workers feel safe and comfortable at work, and that their employers
437	are caring enough. Also, policies that would encourage teamwork and increase workers' sense of
438	belonging should be formulated and implemented. A great WLB would ensure that workers are better
439	able to manage their health and stay safe at work. Furthermore, the results would help us get a clearer
440	picture of the needs of the younger generation so that policies can be formulated to attract them to the
441	construction industry.

442 DATA AVAILABILITY STATEMENTS

443 Data generated or analyzed during the study are available from the corresponding author by444 request.

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447	Industry: Less Working Days for More Safety and More Recruits" funded by the Research Grants
448	Council, Hong Kong (Project Number PolyU 152176/15E) from which papers with similar research
449	background and methodology but with different scope and objectives may have been published.
450	

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