IT'S ABOUT TIME: THE IMPACT OF FLUCTATING WORK HOURS ON THE WORK-LIFE BALANCE OF PROJECT-BASED CONSTRUCTION WORKERS

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A diary data collection method was used to collect data from project-based construction workers in a large civil engineering construction project in Melbourne, Australia. Data capturing the number of hours worked and satisfaction with work-life balance were collected for 21 consecutive weeks. A strong correlation was found between hours worked each week and participants' work-life experiences. Weekly work hours were found to be significantly negatively correlated with satisfaction with work-life balance. Work intensification leading up to a major project milestone coincided with a dramatic reduction in participants' satisfaction with work-life balance, suggesting that project events have a significant impact upon the work-life experiences of project-based workers. Further, recovery opportunities in the form of regular Rostered Days Off coincided with higher levels of work-life balance satisfaction. It is proposed that construction organizations use the naturally fluctuating workloads implicit in project work to 'build' recovery opportunities into project schedules.

Keywords: human resource management, work hours, work-life balance.

INTRODUCTION

Work hours, health and wellbeing

In the Australian construction industry project-based workers spend more hours at work and experience significantly higher work-family conflict and job burnout than workers based in the corporate offices of construction organizations (Lingard and Francis 2004). Further, project-based construction work generally involves weekend work and hours worked outside the standard work week, i.e., overtime. Research has linked long work hours with poor work-life balance (Grzywacz and Marks 2000, Major, Klein and Erhart, 2002, Jansen, Kant, Nilhuis, Swaen and Kristensen, 2004, Voydanoff. 2004). Further, overtime (Berg, Kalleberg, Appelbaum 2003) and nonstandard work hours are also consistent predictors of diminished work-life balance (Jansen *et al.* 2004, Albertsen, Rafnsdottir, Grimsmo, Tomasson and Kauppinen 2008). Spurgeon (2004) reports that regularly working in excess of 48 hours per week constitutes a significant occupational stressor which increases the risk of mental health

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problems, while regularly working more than 60 hours a week, and perhaps working more than 50 hours a week, 'appears to increase the risk of cardiovascular disease' (p.11). Long hours also impact upon somatic symptoms and increase unhealthy lifestyle choices, such as smoking and irregular diet. While studies on working time and safety are limited, there is some evidence to suggest that worker error increases after eight hours of work (Spurgeon 2004). Given the links to workers' health (and possibly safety), working time arrangements are directly related to occupational health and safety outcomes and are deserving of research attention.

Previous analyses of work hours and work-life balance in the construction industry have adopted a cross-sectional survey approach (see, for example, Lingard and Francis 2005). These studies have consistently revealed work hours as a predictor of work-to-family conflict and other undesirable work-life outcomes, including burnout and diminished work and life satisfaction. However, cross-sectional research designs do not reveal the extent to which the work-life experiences of project-based workers vary over time. Project-based work is often rapid and unpredictable (Aitken and Crawford 2007). Projects are high-involvement work environments in which workers are expected to work as long as is required to meet project deadlines (Asquin, Garel, and Picq 2010). There is some evidence that project-based work can have a significant impact upon the quality of work-life experience of workers in the information technology industry (Perlow 1998, Lindgren and Packendorff 2006). However, thus far, work-life researchers in the construction industry have not attempted to analyse or understand the impact of the dynamic nature of construction work on project-based workers.

Aim

This research aimed to explore the extent to which working time varies in relation to the project schedule and events in a major civil engineering project in Australia. Specifically, the research sought to examine the correlation between work hours and work-life experiences over a 21 week period.

METHODS

Data collection

Data collection took place at a freeway upgrade project in Melbourne, Australia, during 2009. The upgrade aimed to eliminate conflicting merging and weaving movements along Melbourne's most heavily trafficked and economically important transport connection by constructing extra collector-distributor lanes in both directions.

A stratified sampling approach was designed to include male and female representatives, waged and salaried workers and workers in different age brackets and family circumstances. The stratified sampling approach was used to recruit volunteers to participate in a diary-based data collection exercise, which constituted one component of data collection in a larger longitudinal research design. As with most diary studies, the sample was a convenience sample but, owing to the fact that the purpose of this research was not to examine between-person or group comparisons, the use of a convenience sample does not necessarily present a problem (Conway and Briner 2002).

Participants were invited to complete a weekly diary over 21 weeks. Participants were asked to indicate how much time they spent engaged in work the week prior to the diary entry. Work hours were rated in eight increments from 'less than 35 hours' to

'more than 65 hours.' Interim ratings were in five hour increments, e.g. 35-40 and 41-45 hours. Participants were then asked to indicate their satisfaction with their work-life balance by responding to the following question: (i) 'All things considered, how satisfied have you been with your work-life balance this week?' rated on a seven point scale from ' very dissatisfied' (1) to 'very satisfied' (7). Participants were also asked to provide additional explanatory comments if they wished to do so.

RESULTS

The sample and response rate
Weekly diary data was collected from 15 June 2009 through to 8 November 2009. The average number of participants in any week was 12.9. However, participation fell after week twelve. This was particularly the case for waged participants. Notwithstanding this, a total of 270 diary entries were recorded throughout the period.

Quantitative data analysis
The relationship between work hours and satisfaction with work-life balance over the 21 week period is shown in Figure 1. A bivariate (Pearson) correlation revealed that weekly work hours were significantly negatively correlated with overall satisfaction with work-life balance (r=-.142, p=.020).

Qualitative data analysis
Table 1 shows the results of the thematic content analysis of qualitative comments provided by participants in the weekly diaries. Qualitative comments provide some possible explanations for the 'peaks' and 'troughs' observed in weekly work hours and satisfaction with work-life balance. A peak in work hours is evident around weeks two and three. At week three there was a peak in numbers of workers on-site, which coincided with end-of-month reporting activities. In week nine reported levels of work-life balance satisfaction peaked.

An examination of qualitative comments indicated that the waged workforce had a Rostered Day Off (RDO) during week nine, meaning that they were not required to work on the Monday of this week. Participants' comments indicate that work activities and previous opportunities to recover afforded by taking annual leave had contributed to reduced stress levels in week nine. At week 13 participants' levels of work-life balance satisfaction peaked again. During this week some staff took annual leave, prior to the peak construction activity required to prepare for a major milestone (the opening of a ramp onto the freeway) scheduled for week17. Between weeks 14 and 17 reported levels of work-life balance satisfaction decreased considerably. Although a Rostered Day Off was scheduled in week 16, many workers postponed taking this break in order to meet the deadlines associated with the scheduled ramp openings. The ramp opening occurred in week 17. In week 18 participants reported higher levels of work-life balance satisfaction as workers took the Rostered Day Off they had previously postponed, and the successful ramp opening was celebrated. Between weeks 19 and 20, work hours again increased and reported levels of work-life balance satisfaction decreased. The comments made by participants in weeks 19 and 20 indicate that as the project was close to completion, some workers were commencing work at new projects, while still completing tasks at the freeway project. Week 21 was an unusual week in that Monday was a Rostered Day Off and Tuesday was a public holiday so the site was closed, resulting in a three day work week. Reflecting this, work hours were considerably lower than the previous week.
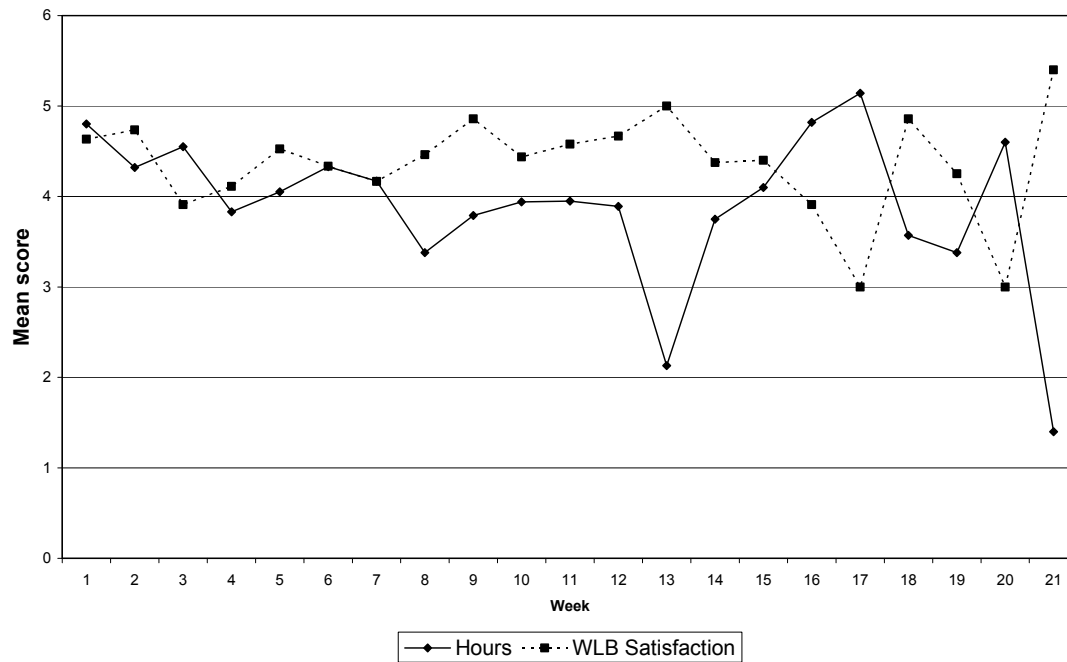
Figure 1: Work-hours and satisfaction with work-life balance

Table 1: Thematic analysis of qualitative diary data

Week	Theme (frequency)	Comments
1	Unfinished work	As usual, too much to do – not enough hours in the week. Time flies by and you look at what you meant to achieve at the end of the day and end up carrying most of it over to the next day. I came into work at 4am one morning to try to get ahead on work. Was a bit sleep-fatigued due to error one morning and that carried over for a day or two.
	Work interference with personal life	Spend 2 ½ hours a day in car driving to and from work alone. This takes time out of family time. Our team suffered 4 absences this week, which puts extra strain onto other staff. I attended 1 day training, which interrupted the schedules at home, picking kids up, as the training went to 5pm and I usually work 6am – 2.45pm. Haven't had time to exercise this week but will make up for it next week whilst on day shift. Currently renovating at night which has added a bit more stress but handling OK.
2	End of month pressure	It's end of month reporting time and our work team had a day off for team building which made me feel a bit rushed at work. End of month meant extra hours worked. Also did work on old [company name] job that is now complete. Attended [company name] info session out of hours. Daughter had 2 performances at night. It's always busy at work when its end of month.
3	Feeling fatigued	Have been busy covering other peoples work and getting further behind on my own. Am tired and looking forward to taking some leave – have only had 2 leave days in the last year (not counting Rostered Days Off). Have been doing lots of overtime so am ready for time away from work. I did one night shift (only 3 hours) so I didn't take any time off. It's amazing how 3 hours less sleep can make you feel so tired for the remainder of the week.
	School holiday	School holidays are always a juggling act. Kids were on school holidays – less strict timetable. Took a day off on Friday to

Week	Theme (frequency)	Comments
	impact	catch up on a few things at home.
4	School holiday impact	Kids are on school holidays, takes pressure off being at home at a certain time. The work flow is a bit less at the moment. Kids away on holidays therefore more time for myself and wife.
	Manageable workload	My manager is good at predicting work flow and realistic resource requirements. Monthly reporting complete.
5	Unexpected family events	Had a personal emergency so have had to take time off to sort stuff at home (am currently running between work and hospital/doctor) so not feeling like getting anywhere with either. Unfortunately I had a death in the family, so I flew back home and only worked one day (so hours worked are low).
	Project going well	Project coming together really well. All team pulling weight and working well together. School started back and routine started again. Not a bad week.
6	Long hours	Get to work and its dark, and when I get home its dark so I don't get much done at home. I realize it is winter but it is still annoying somewhat. I had a training day and stayed back one day to catch up with night shift but didn't actually work night shift. Including Saturday work and 1 day at training.
7	Work pressure	Stayed late to catch up with night shift a couple of times. Had a shocking week – lots of activity with community planting day and freeway closure!! Had a breakdown on Friday!!
8	Reduced hours (leave taken)	On annual leave this week – hence hours low. I worked a three day week.
9	Balancing	I didn't have as many meetings this week, which was a huge help for my work life balance. Demands at home forced me to spend tow days 'working for home' – felt better able to manage my time more flexibly.
10	Balancing	Better work life balance. Early starts each day this week (by choice) but challenging to leave early at end of day (i.e. Can just end up extending the work day – counter productive). The effort to balance work/life is a great initiative. To me the greatest balance tool is the Rostered Days Off as this allows a sleep in and the availability to go to businesses, shop etc. that are not open Sunday.
11	Work interference with family	Had opportunity to get ahead on my work for first time in awhile – but at expense of getting chores done at home – frequently too tired in evening. Very hard juggling work and home when you're a single parent. Not much time for anything in between. Attending a half day training course made less time for urgent work duties. A few family concerns made me feel I didn't have time to spend with them as I was busy at work.
12	Night shift	Major night shift on Saturday night. Came in Saturday morning for approximately 1.5 hours, catching some sleep during the day, then night shift of 12 hours. Needed Sunday to recover and straight back to work early on Monday. Felt tired almost all day Monday and left earlier than normal at 4.30pm which was still a 9 hour day. No time for any personal interests/activities all weekend.
13	Reduced hours (leave taken)	Things are winding down at work. Had a full week at home. Had 2 days leave. On leave. I was on leave all week. I love holidays!!!
14	Time pressures	Stayed back until 8pm one day to start off night shift which was then called off due to rain. This was a relief. Have felt a bit sick for 2 days, still went to work though as there is just too much going on that I couldn't miss. Didn't sleep well

Week	Theme (frequency)	Comments
		during this time and felt tired at work.
		As a single parent it is impossible to keep up with family and home. When you have to work to keep it going at home, something must give and normally its at home.
		Tired didn't go to the gym – had time, just tired.
15	Time pressures	Peaking at the project – heaps of work on at the moment. Everyone's patience is running low and most people are very stressed out.
		School holidays put pressure on house work activities. We are down a resource at work, so a bit of added workload.
		Just back from annual leave and already back into the craziness.
16	Overwork (ramp opening)	Opening the road!! Crazy week!.
		10 hour night shift on Thurs after a 8.5 hr day shift with only 2 hours of light sleep in-between. Back at work for Friday day shift and start of night shift (until approx 9pm). There were lots of essential works to complete this week for major ramp openings on Saturday. I will also be on night shift tomorrow.
		Feeling overall very tired and have little energy for house work, shopping etc.at home.
	New projects	I'm helping out on another project which is a learning curve and a lot of work.
17	Long hours	12.5 hours night shift on Saturday. Therefore Saturday and Sunday required for rest; was still tired at work on Monday. Number of work hours felt like even more due to previous weeks night shift Thursday night.
		Only one night shift but I have worked the last 12 days straight. 80 hours this week alone…
18	Winding down	I could certainly feel that things on the project started winding down. Monday was really only ½ day work due to celebratory lunch and late start for me because of marathon race on Sunday.
		Handing over project, so work is decreasing. Doing 3 days at next project, so just ramping up.
19	Balancing	Am trying to manage my time better to escape and get home in time to walk the dog. Helps in daylight saving with longer daylight hours.
		Only briefly went to site for approximately I hour at night to check on night shift crew – 9pm – 10pm. Did not interfere with home life.
	New projects	Helping on another job – so doing 2 jobs. Had a workshop away – 2 days/nights away from home/ Adds pressure and breaks routine. I now feel I'm coming down with a cold.
20	New projects	Very busy week but feeling productive.
		Juggling two projects with a big workshop on, I feel like I haven't had 5 minutes to myself in 2 weeks.
21	Short week (public holiday)	Had a Rostered Day Off and public holiday felt a bit of pressure because it was a short week but being relaxed after a long weekend made up for it.
		Mon and Tues leave days for Melbourne Cup.
		Public holidays and time in lieu.

DISCUSSION

The correlation between work hours and work-life balance

The results highlight the (negative) correlation between hours of work and construction workers' satisfaction with work-life balance. Van Hooff, Guerts, Kompier and Taris (2006) assert that time engaged in work reduces the time available for family and consumes energy that could otherwise be spent in tasks required at home. Participants in the diary study reported working long hours. For example, 62.2% of responses over the 21 week period indicated weekly hours of work in excess of 45 hours per week. This figure rose to 71.2% in week 17, immediately prior to the ramp opening. In the Victorian construction industry the standard work week is 36

hours. Work hours outside this standard work week are classed as overtime and working overtime is a common practice in the Australian construction industry. Hours worked outside the standard work week are paid at a penalty rate (for waged workers). However salaried workers, who are mainly managerial, professional or supervisory workers, do not usually receive higher pay for work outside standard work hours.

Taris, Beckers, Verhoeven, Guerts, Kompier and van der Linden (2006) distinguish between the work-life impacts of working the number of hours specified in one's contract and working overtime. They argue that overtime, which is defined as 'an occasionally occurring, unplanned and short notice form of effort expenditure' (p.141) utilizes time that has been structurally reserved for non-work activity, such as external recovery from work or the fulfilment of non-work obligations. They report that overtime is positively associated with time-based work-home interference, i.e., working overtime reduces time for non-work tasks. The results of the present research are consistent with those of Taris *et al.* (2006). The majority of participants in the construction study reported working hours in excess of the standard work week for Victorian construction projects, and the higher the number of hours participants reported working each week, the less satisfied they indicated that they were with their work-life balance.

The impact of project events
The results also suggest that the timing of project events impacts upon the work-life experiences of project-based workers significantly. Between weeks 14 and 17, workers at the freeway project were preparing for a major project milestone, i.e. the opening of a new ramp onto the freeway. The timing of this ramp opening was fixed as the event was to be attended by the State Premier of Victoria and would attract considerable media attention. During this period, the number of hours participants reported working each week climbed dramatically (see Figure 1). An analysis of the qualitative comments written by participants' indicated that between weeks 14 and 17, they were feeling very time-pressured and they attributed this pressure to the impending ramp opening. For example, one participant wrote: 'Peaking at the project – heaps of work on at the moment. Everyone's patience is running low and most people are very stressed out' (week 15). Another wrote 'Opening the road! Crazy week!' (week 16). This suggests that work-life experiences are inextricably linked with project activities and milestones.

Opportunities for rest and recovery
The research results also indicate the importance of recovery opportunities in supporting work-life balance in project-based construction work. It is a requirement of the Victorian construction industry that waged workers are provided with regular 'Rostered Days Off.' These are scheduled paid days off work designed, in part, to compensate for regular work undertaken on Saturdays. At the freeway construction project, the management team decided to extend these 'Rostered Days Off' to salaried workers who are not usually entitled to them. Also during the data collection period, there were a number of public holidays and periods during which participants reported taking annual leave. For example in week 13, modal hours worked (by 50% of participants) was <35 as a number of participants indicated they had taken annual leave. Periods in which rest and recovery opportunities were available coincided with higher levels of satisfaction with work-life balance. The importance of recovery opportunities in achieving work-life balance was also evident in the qualitative comments provided by participants. For example, one commented: '[I] have been busy covering other peoples work and getting further behind on my own. [I] am tired

and looking forward to taking some leave. [I] have been doing lots of overtime so am ready for time away from work.' Another wrote: 'To me the greatest balance tool is the Rostered Day Off as this allows a sleep in and the availability to go to businesses, shop etc. that are not open Sunday.'

Working long hours can impact upon workers in two ways: (i) because effort is expended over a longer period, it increases the psychological and physical 'costs' experienced by workers; and (ii) it reduces the time available to workers to engage in restorative recovery activities (Taris *et al.* 2006). Comments made by participants in the present study suggest that the length of work hours prohibited their recovery from work. For example, one participant wrote: 'as usual [I have] too much to do – not enough hours in the week. Time flies by and you look at what you meant to achieve at the end of the day and end up carrying most of it over to the next day. I came into work at 4 am one morning to try to get ahead on work.'

The advantages of diary data collection

The results show the usefulness of diary-based data collection for capturing data about work hours and work-life balance in the dynamic environment of a construction project. Diary-based data collection reveals important fluctuations in work-life experiences that would be masked by reliance upon cross-sectional survey designs. Further, diaries are subject to less retrospective bias than other data collection methods and enable small changes to be detected, making them particularly useful for capturing data about workers' weekly, or even daily, experiences (Bolger, Davis and Rafaeli 2003).

CONCLUSIONS

The research indicates that long work hours inherent in project-based construction work are a problem for work-life balance. The length of work hours is inversely correlated with satisfaction with work-life balance over time. Further, work time fluctuations appear related to project events. Opportunities for recovery afforded by short, temporary breaks from work were valued by participants who reported higher levels of satisfaction with work-life balance when recovery opportunities were available. The results suggest that construction organizations should carefully consider the impact of major project events on the work-life experiences of project-based workers. One strategy to support work-life balance could be to proactively build recovery opportunities, during periods of reduced work intensity, into the project schedule. The results also highlight limitations associated with the reliance on cross sectional surveys for collecting data concerning project-based workers' work-life experiences, which are likely to be influenced significantly by the timing of data collection.

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