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How Does the Five-Day Work Week Impact Labour Productivity? Exploring the Perceptions of Australian Construction Workers

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Abstract: Construction is a long-hours industry in which people often work a six-day week. This research examined the extent to which shifting to a five-day week schedule impacts labour productivity in construction projects. Five construction projects in Australia implemented a five-day weekly schedule. Interviews were conducted with 89 workers across five projects to explore workers' subjective productivity and reasons for any perceived changes in productivity associated with the modified schedule. Thematic analysis of interview data revealed that, while some workers perceived the five-day week to be less productive, the majority of participants perceived their productivity to be enhanced, due to a variety of health- and work-related factors. In particular, people experiencing a two-day break from work each week indicated they were better rested and more energetic and engaged in their work. Participants also suggested work was better planned in order to manage the five- compared to the six-day week, and quality improvements also reduced re-work. The research concludes that perceived negative impacts on production associated with not working on Saturdays are offset by an increase in productivity arising from improved health and positive work outcomes associated with the five-day schedule.

Keywords: construction workers; mental health; productivity; recovery; work schedule

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1. Introduction

1.1. Impact of Demanding Work Schedules

In Australia, construction projects have typically been scheduled according to a six-day work week and it is common that workers will work more than 50 h per week [1]. Regularly working more than 48 h per week is described by the International Labour Organization (ILO) as long work hours [2]. According to ILO guidelines, construction can be described as having a long-hours working culture. Despite the belief that long work hours will result in high productivity [3], long work hours are associated with lower unit labour productivity [4] and are known to have a negative impact on workers' health and wellbeing [5]. A healthy workforce produces fewer health costs and higher productivity, suggesting that poor employee health and wellbeing can heighten costs and reduce revenue for organizations [6].

Long work hours and nonstandard work schedules are key contributors to the significant mental health problem experienced by the construction workforce [7,8]. When construction workers consistently work long hours over a six-day work schedule, they do not have sufficient time to fully recover from the working week and their mental and physical health suffers [9]. The inability to fully recover from the working week can leave

workers feeling fatigued as they move into a new working week. According to Sadeghniiat-Haghighi and Yazdi [10], fatigue directly influences a worker's physical and mental capacity to undertake work tasks. The effects of fatigue include "*decreased task motivation, longer reaction time, reduction of alertness, impaired concentration, poorer psychometric coordination, problems in memory and information processing, and poor judgment*" [10] (p. 13). An adequate period of non-work time is required for construction workers to recover from the mental and emotional stress associated with excessive hours [5]. Importantly, a continuous schedule of long working weeks in succession does not provide workers with the necessary restoration they require and, without this, health and work productivity may suffer [11].

Due to their long work hours and nonstandard work schedules, construction workers are reported to experience high levels of work–family conflict, described as the extent to which role pressures from the work and family domains are mutually incompatible [12,13]. Work–life conflict is associated with negative psychological and physical health outcomes. Therefore, the high incidence of work–family conflict experienced by construction workers is problematic because workers who experience less negative spillover from home to work are more likely to be more productive on the job [14].

1.2. Importance of Time for Recovery

Recovery refers to the process of replenishing resources that occur when workers distance themselves from their work [15]. Individual resources can be reestablished during the weekend when the worker is no longer faced with their usual work demands [15,16]. The absence of work-related demands during the weekend allows workers to invest in new resources and to initiate resource gain, emphasising that having time away from work is crucial for replenishing resources. Importantly, diminished health and performance are said to be attributed to a lack of individual resources [16].

Research has examined the impact of a two-day weekend on recovery opportunities and the mechanisms through which recovery occurs, and studies show that resources are replenished in a number of different ways. Spending time with important others rebuilds resources that pay off after the weekend, indicating that spending time with other people can be one way of recovering from work demands [16,17]. Fritz and Sonnetag [16] also found that social activity during leisure time was positively associated with task performance after the weekend and had a positive effect on health. The findings of Fritz et al. [18] indicate that taking adequate time to relax during the weekend significantly explained variance in several positive and negative affective states at the end of the weekend and to a lesser extent, during the following work week. Relaxation during a weekend is important as it is positively related to the state of being recovered at the beginning of the working week, and the state of being recovered, in turn, is positively related to weekly task performance [18,19]. Furthermore, resource replenishment after a weekend of recovery contributes to increased work engagement [20].

Ginoux et al. [15] examined the indirect relationships of recovery activities on changes in burnout and vigor through weekend recovery experiences, and their results confirm the importance of weekend activities and recovery experience for improving wellbeing. After controlling for job demands, Ginoux et al. [15] found that changes in burnout and vigor were positively predicted by the weekend recovery experience. In addition, four out of six weekend activities predicted negative (work-related activities) or positive (social, physical, and creative activities) recovery experiences. The results also revealed that the recovery experience was a full mediator of the relationships between weekend activities and vigor change.

1.3. Theories Linking Recovery to Health and Productivity

The path through which work schedules can impact productivity can be understood in the context of the job demands–resources (JD–R) theory. The JD–R theory considers how the various aspects of the physical and social work environment can influence job performance through worker's wellbeing [21]. The JD–R theory identifies that psychological characteristics associated with any job situation can be determined according to two characteristics: job demands and job resources. Job demands are described as the physical, psychological, social or organizational aspects of a job that require workers to expend effort and energy and therefore create a physiological or psychological 'cost' for workers. Job resources are described as the physical, psychological, social or organizational aspects of a job that support goal achievement, reduce demands or stimulate learning, growth and development [22]. An underlying assumption of the JD–R theory is that both job demands and job resources influence health outcomes. When jobs have enough resources to support demands, health is maintained. However, when job demands are in excess of the available resources, negative consequences occur and work performance suffers [23,24].

Work schedules that do not enable rest and recovery opportunities afforded by a two-day break can damage the wellbeing of workers by increasing demands and depleting resources [5,19]. Ruderman et al. [5] further contend that with increased time demands, there leaves minimal time for recovery or to replenish the resources needed to carry the expanded load, concluding that a long-hours culture is a culture of high demand and little renewal of resources, creating a vicious cycle. An imbalance between an individual's work demands and having adequate time to recover can be framed using the effort–recovery theory [25]. The effort–recovery theory contends that the demands of work produce temporary psychological and physiological costs for workers. When workers have adequate recovery opportunities, they are able to restore energy and return to their normal psychobiological state [25]. The effort–recovery theory can be used to explain that having adequate time to recover from work demands expended during the week can help construction workers to restore their resources. In cases where recovery opportunities are not sufficient, workers are required to expend an increasing amount of effort to satisfy the demands of their work, which can impact productivity and potentially lead to a downward spiral effect where workers experience exhaustion and disengagement from work [26].

By applying the JD–R and effort–recovery theories to the construction industry, it can be expected that workers will experience poor health outcomes when they have diminished opportunities to adequately recover from work demands [27–29]. This is particularly the case when construction workers are required to undertake their work over six days and routinely have only one day off to rest and recover. However, when workers are afforded with two consecutive days off, it is likely to enable recovery opportunities that will impact on the self-perceived labour productivity of construction workers.

1.4. Productivity Mesaurement

According to the Australian Productivity Commission [30] (p. 5), "*productivity is a measure of the rate at which output of goods and services are produced per unit of input*". One of the main input measures used to measure productivity is 'labour productivity', referred to as the ratio of output to hours worked [31]. Construction is a labour-intensive industry and it is estimated that labour costs account for between 30% and 50% of total actual project costs [32]. Labour productivity is therefore an important factor in overall project performance. Hazma et al. [33] identified the top factors related to construction labour productivity and report that much of the research to date has been undertaken from the perspectives of managers and executives. In contrast, minimal research has been conducted on 'labour's' perspective of construction productivity [33]. Quantitative measures of

productivity produce important information about the performance of a project, but fall short of providing the reasons contributing to labour productivity outcomes. An alternative and complementary approach to labour productivity assessment is to ask for the subjective opinion of workers [34]. In contrast to 'objective' measures of productivity that utilise information from operational data, subjective productivity measurement (SPM) is based on workers' subjective assessments. Subjective measures of productivity comprise data based on opinions, feelings, and attitudes, which can be difficult to quantify [34]. SPM is defined as "*a method for acquiring productivity information by gathering and analysing the assessments of relevant stakeholders regarding direct or indirect productivity of the measurement object*" [35] (p. 3). SPM collects subjective data from a target group to examine the factors impacting their productivity [34]. Antikainen and Lönnqvist [34] further assert that, while subjective measures rely on respondents' perceptions and do not necessarily represent the objective reality, SPM is an effective way to provide valid information about how people experience their work environment and the factors that affect their work. It is anticipated that knowledge gained from SPM can inform the redesign of work and modify work practices that impede labour productivity.

1.5. Research Aim

Given the severe mental health epidemic in the Australian construction industry [36], there is an urgent need to consider ways in which work can be redesigned so that workers' health and wellbeing are protected. Providing workers with ample time to recover from the demands of work is one way to protect their health [15,16]. Based on the extant literature, it is anticipated that construction labour productivity may improve as a result of having adequate recovery opportunities [25]. Limited research has explored the impact of a re-distribution of work hours across five days to enable two consecutive days off and its subsequent impact on construction labour productivity. To address this gap in knowledge, our research explored the subjective productivity of construction workers who have experienced a five-day project schedule and had two consecutive non-work days off. The JD–R and effort–recovery theories are used to position the research. The research questions framing this exploratory research are as follows:

How does a five-day on/two-day off project work schedule impact the subjective productivity of construction workers?
What factors contribute to subjective productivity of construction workers working on a five-day on/two-day off project work schedule?

2. Materials and Methods

2.1. Sampling Strategy

Participants from five construction projects were invited to participate in an interview. All projects had chosen to participate in a trial whereby work hours were re-distributed so that workers had two consecutive days off each week. As it is common that construction workers work a six-day week, waged workers who are paid by the hour had the opportunity to work extra hours during their five work days to offset income from not working on the sixth day. Weekly work hours were capped at 50 for all project workers. Three of the projects were horizontal (civil engineering) and two were vertical (building) construction projects, and all projects were delivering major community infrastructure. All projects were programmed to primarily work five days a week, with the exception of the three horizontal projects that had planned some brief intensive work periods. For some projects, occasional Saturday work did occur when specific tasks were undertaken, such as setting up cranes.

Participants were recruited with the assistance of the project management teams. The sampling frame was provided to the project to ensure that, where possible, the sample

included participants from different age groups, genders, family structures, and site and project-office based roles. As a construction project team is typically made up of workers directly employed by the constructor as well as sub-contracted workers, both sets of workers were invited to participate in the study. A sample of 20 individuals from each project was recommended to meet the criteria outlined in the sampling frame.

The university ethics committee provided approval for the project (project 24668). At the commencement of each interview, participants were provided with a Participant Information Statement and Consent Form. The interviewer explained the research to participants and requested permission to audio-record the interview for transcription purposes. Participants were advised that their involvement was voluntary and data confidentiality would be strictly protected. Interviews were conducted at the project construction site during work time.

2.2. Instruments

Interviews were semi-structured and open-ended, i.e., while an interview schedule guided the interview, new questions were asked as a consequence of what the interviewee said [37]. In addition, at the end of the interviews, participants were asked to provide any additional information that they felt would be useful to the research. As SPM is purported to be particularly useful when seeking to explore the impact of an altered work schedule on productivity and the mechanisms through which productivity occurs, interview questions focused on experiences and perceptions of a five-day work week with two consecutive days off. The following interview questions were asked:

- How do you like your work schedule?
- Can you do all your assigned work within your five-day work schedule?
- Has your productivity been impacted by working a five-day week?

All interviews were recorded and transcribed verbatim, and transcripts were thematically analysed and coded using an inductive approach by two researchers to ensure reliability in the coding/analysis process. The analysis process followed the six stages as outlined by Braun and Clarke [38]: familiarisation with the data; generating initial codes; searching for themes; reviewing themes; defining and naming themes; and producing the report.

3. Results

3.1. Participant Demographics

Table 1 outlines participant characteristics at the five projects. Seventeen interviews were undertaken for each of projects 1, 2, and 4, and nineteen interviews were undertaken for each of projects 3 and 5. At all projects, more males than females were interviewed, which is reflective of the male-dominated Australian construction industry [39]. The age of participants ranged from 19 to 69 years. At all projects, interviewees comprised both workers directly employed by the constructor and sub-contractors. The majority of participants worked on average 10 h per day, and years working in construction ranged from 8.6 in project 1 to 16.8 in project 5. At the time of the interviews, project completion was 60% at project 1, 28% at project 2, 65% at project 3, 60% at project 4, and 35% at project 5.

3.2. Themes

The themes arising from the analysis were productivity on Saturday; associating more hours with higher productivity; rest and recovery; choice and control associated with a two-day weekend; and mental health. Each theme is described in this section along with illustrative quotes.

Table 1. Participant characteristics.

Project	Sample	Gender		Age Range (Years)	Employer		Daily Work Hours (Mean)	Years Working in Construction (Mean)
		Male	Female		Constructor	Subcontractor		
1	17	9	8	25–52	14	3	10.6	8.6
2	17	11	6	26–50	9	8	10	9.8
3	19	14	5	19–52	13	6	10	10.8
4	17	10	7	22–58	7	10	10	9
5	19	11	8	19–69	10	9	10	16.8

3.2.1. Productivity on Saturday

A small number of participants perceived that restricting the working week to five days resulted in decreased productivity. These participants believed that working on a Saturday resulted in more work being achieved. For example, a participant from project 1 commented: "*I mean, you'd certainly get more done if you're working the Saturday as well*". Similarly, a participant from project 4 commented: "*we could do more if we did the Saturday*".

Saturday and weekend work was described as a "catch up" day or "make up" day by some participants. For example, if rain had caused a delay during the week, the weekend could be used to catchup: "*Using that for makeup for times. . . if you missed a couple of days during the week, you get rained off or something like that you could usually make it back up on the weekend*" (project 1). A participant from project 3 similarly commented that the project can catch up on the weekend when it is behind schedule: "*there are some weeks when you're under the pump and then you actually look at that Saturday and go, if we could just do it, we could get ahead*".

Some tasks could be more easily completed on a Saturday as the construction site usually had a smaller workforce and was less busy than Monday to Friday. For example, cleaning up the site on a Saturday was considered by a participant from project 5 as an important task that could not be easily performed from Monday to Friday: "*If you don't get in there to do that bit every couple of Saturdays to do a big tidy up, clean this up, get ready for this, you never get a chance to do it. . . I still believe it's good to work the odd Saturday*". A participant from project 3 also commented that Saturday is useful for undertaking tasks that are difficult to carry out on a busy work site: "*That extra day you can really flood an area, get things done you wouldn't be able to usually do during the week. Saturdays are less busy, you get less deliveries, the site is less busy, but in terms of there's not as many workers, it's not full capacity. It does make a difference*".

While some participants perceived that working on a Saturday could increase productivity, Saturday was considered by some participants to be less productive than Monday to Friday work days. For example, a participant from project 3 explained: "*I would say six days would be more productive because you have that extra day. I wouldn't say the six days is as productive as the other five days, but you still get a decent amount of stuff done*".

In contrast to the small number of participants who perceived that Saturday is a productive working day, the majority of participants perceived that Saturday is not a productive work day. One reason for this is that Saturday is usually a shorter work day. For example, participants from project 1 commented: "*You don't have much productivity on Saturday because by the time you get up, come to site, you'd start work at 7:45/8 o'clock and then you go to smoko [break] at 10:30, then lunch then you finish at 1:30. It's stop, start, stop, start*", and "*you don't get much productivity on Saturdays unless you work a long day, treat it like a normal day, but it's never the case*". A participant from project 3 similarly noted that productivity is low on Saturday: "*Sometimes in the past, in other projects I felt like we were going to work on Saturdays and it's mainly to just go there to get paid but not much work would get done on a*

Saturday. People there they are not thinking about working hard, they just want to be there, do the hours and get out, you know. Normally you will be there from 7.00 to 1.30, so you are not there for many hours so not much can get done". Other participants from project 3 also reflected on the lack of productivity on a Saturday: "*It was like everyone was just there and you got nothing done on Saturday and it just seemed to be a waste of time mostly*", and "*Why you have to work Saturday, it's ridiculous. You don't even do anything*".

There was also a perception that workers are not focused on work during Saturday and that lack of motivation impacted on productivity. For example, a participant from project 3 explained: "*The Saturdays were a bit of a fluff day in the past. Like you'd lose the guys for an hour at lunch time. They only worked till 2:00, their motivation would be out the door after lunch anyway. Sometimes you get a little bit of good things here and there done, but by and large you weren't getting a normal day of the week productivity. But it was still considered a day of program*".

When a six-day program was being carried out, productivity on a Saturday could also be impacted by fatigue experienced by workers. For example, a participant from project 3 identified that he did not like to be at work on a Saturday due to fatigue: "*On the Saturday you feel a bit tired, it gets to you*".

3.2.2. Associating More Hours with Higher Productivity

All participants had experience of working a six-day week on past projects, and the majority of participants challenged the belief that more work hours led to higher productivity on construction projects: "*More hours is not always going to produce a good quality and more speed*" (project 3). Many participants perceived that there was no change to productivity when comparing a five-day week to a six-day week. For example, a participant commented: "*No, I don't think it's any less. I think it's the same. I still do the same*" (project 1). Similarly, a participant from project 3 commented on the productivity of a five-day versus six-day week: "*I think it's about the same*". Some participants from project 4 also perceived there to be no change to productivity. For example, "*It's just normal in terms of productivity, in terms of how much to achieve during a day. I don't think it's changed*", and "*I know you have less time to get things done, but I don't think it has impacted productivity too much*".

Some participants who were initially concerned about their capacity to complete their tasks within five days had successfully adapted to the five-day week. For example, "*I think it's great, Monday to Friday. When I first started on this project, I was worried I was going to have to work on weekends. I was very happy to hear that we wouldn't have to. So no, I think productivity is you have 5 days to get it done, you put in as much effort as possible to make sure you have that time on the weekends and after work hours to relax*" (project 3). Another reason why productivity had not declined despite working fewer days was participants' ability to adapt their work effort to fit in with the five-day week. For example, a participant from project 4 commented: "*I've kind of had to recalibrate now based on I don't have that day [Saturday] anymore and so really Friday becomes that day and I've probably got into that rhythm now but it took me a while. I always felt like I was little bit behind when I first started on the five day working week*", and "*knowing that you don't have the Saturdays probably directs you to work in a more routine style of work. So it is an adjustment but it does work*".

Another participant from project 3 explained that some tasks have been added to Friday so that Monday is productive: "*The only downside [of not working on Saturday], I think some people come in on Mondays and forget what happened on Friday, and it takes them a little bit to regroup and get their bearings. Myself included. But just a couple of minor changes to how we operate on Fridays, and sort of write yourself a reminder list for the Monday, and off we go from there*".

Many participants acknowledged that when they were working on Saturday at their previous projects, they would often carry over work tasks from Friday to Saturday. For example, a participant from project 3 commented: "*I think if I knew I was going in on a*

Saturday, maybe I'd take it a bit easier on the Friday and be like, 'I'll just save this work for tomorrow'. Whereas I know I've just got to pack it into the week, to get it all done. Which is definitely good for productivity". Another participant from project 3 also identified that people no longer wasted time because Saturday work is no longer an option, and this has had a positive impact on productivity: "*To be honest I feel like this project has gone very, very well. We've finished very fast. I believe because people know that they only work Monday to Friday, they are not wasting their time. So they are making sure that everything is organized to get it done properly whilst we are working*".

Most participants were able to fit all their work tasks into five days. For example, a participant from project 5 who worked from Monday to Friday commented: "*I reckon you get the exact same thing done without the Saturday, because you can't do it tomorrow. If it's the end of the week, you're in good form because you're off for two days. You're like, 'right, let's just get this done. It's Friday, come on. Let's knock off. We'll get this done and we'll get out of here'. When it's like on a Friday and you're working on Saturday it's like, 'Shall we do that tomorrow?'*". A participant from project 4 similarly commented: "*I think yes probably I'm more productive. Don't leave things run over into the weekend and then run over into the next week*". A participant from project 5 also perceived that work can be completed during a five-day week when Saturday is no longer a work day: "*I think if you do Saturday, it will lower your productivity throughout the whole week. So having Saturday and Sunday off, it just maximises the productivity that you do in the five days period of work*".

3.2.3. Rest and Recovery

Most participants perceived that productivity had either not changed or increased despite working fewer days and this was due to feeling rested. Many participants described having more energy after a two-day work break: "*I feel like I have more energy and more engagement with this kind of work*" (project 3). Having two days off to rest and recover was identified as a key factor impacting productivity outcomes. For example, a participant from project 1 explained that they had observed no loss of productivity due to workers feeling rested: "*I think the team has done pretty well to make sure there's been no loss of productivity. But also I think the workers have been more rested so they haven't been forced to come in for the sixth day. I think they've done pretty good to keep everything, like a momentum going*". When reflecting on productivity and working a five-day week with a two-day break, a participant from project 2 similarly observed that: "*I think people come back more rested*". A participant from project 5 also observed that more work is achieved in a shorter amount of time due to workers feeling rested: "*It seems like everything's at a slower pace, which is good. But if you can imagine, it seems like we get more done. And I think that's because everyone is rested and everyone's not run off their feet*".

Many participants perceived that rest gained over a two-day break enabled them to start work on Monday fully recovered from the previous week of work. For example, a participant from project 5 commented: "*It's impacting it [productivity] in a positive way, because you can detach and turn off from work. And then, when you come in on a Monday, have a fresh perspective, like you were able to relax. So having that weekend, having two whole days, including even Friday evening, to relax, do what you want, and then rest, recover, recharge*".

Feeling rested and recovered had a positive impact on productivity as workers observed less mistakes being made, which reduced the need for re-work. For example, "*When you're exhausted you make more mistakes. Sometimes you can't focus well. I'm just talking from the past experiences where you know your system is overworked when there are some things that are so obvious that you say, 'How did I miss this?' So for me, someone who does not get enough rest they're most likely to make mistakes. And on a construction site, especially if you're out there, that mistake can also be fatal because it could be a safety mistake as well*" (project 4). A participant

from project 3 had also observed that working a five-day week had led to fewer defects due to workers experiencing less pressure and thinking more clearly: "*there was a lot of defects happening [on the six-day week project]. If you're enticing more people through with less work hours, less pressure, they could see things probably clearer and they could avoid those situations*". A participant from project 3 had also observed a decrease in re-work: "*In order to not waste time, they are making sure that whatever we are doing is being productive and it's effective and we are not doing things multiple times for no reason*".

Working fewer days and feeling rested had led some participants to enjoy their work more, which had led to higher productivity. For example, a participant from project 4 commented: "*I'm more productive. I enjoy work more and I'm more passionate about it because I don't resent it. And definitely more productive especially knowing I don't have to go in on a Saturday*" (project 3).

3.2.4. Choice and Control over Non-Work Time

For many participants, this was the first time in their working life that they had experienced two consecutive non-work days, and participants contrasted how they had spent their time when they had one day off versus two days off. When participants worked a six-day week with one day off, they often spent their non-work day resting, completing chores or spending time with their family. However, having two consecutive days off introduced choice and control over use of non-work time for participants. Rather than being forced to perform necessary chores during their one day off, having two days off provided participants with the ability to incorporate a range of activities including rest, exercise, leisure, and time with family. Having two consecutive days off also eased the pressure of having to compress all non-work activities into one day.

Having enough time for rest after a demanding work week was important for participants and this was enabled by having two consecutive days off. For example, a participant from project 2 commented that on his one day off in past projects, he would usually spend the day resting due to feeling fatigued; however, this had changed with a two-day weekend: "*I choose to have a full day of rest. I wake up, spend some time with the kids and I get another choice of another rest on a Sunday, if I have to*". Another participant from project 2 who worked from Monday to Friday explained that he did not set his alarm on Saturday and was able to rest for as long as he needed to: "*On a Friday evening, that's when I'm pretty tired. And then I get a long sleep. I don't set any alarm. Well, if I'm not working the next day, I don't set any alarm. I just wake up when my body wakes up, and then I feel like I'm reset again*".

Some participants used their two non-work days to increase the frequency of exercise. For example, a participant from project 2 prioritised his health and tried to exercise as much as possible and having a two-day weekend helped: "*Saturday morning because of the five day working week I can go to the gym on a Saturday morning and then maybe go for a run sometime on the weekend too*".

Many participants found that having two non-work days enabled them to spend time resting as well as having quality time with family. For example, a participant from project 3 explained that not working on Saturday had enabled him to attend his children's activities as well as relax, which all contributed to a positive attitude towards work for the following week: "*With the extra time [off work] you spend more time with your family, you relax more, you feel fresh on a Monday and you have a positive attitude when you come in. It's like you're well rested, and kid and family wise, you spend a lot more time going to the games as a father that I missed out years ago on my kids. I missed out on the footy, the netball. Everything was on a Saturday morning*". Another participant from project 2 explained that having one day off work at previous projects had been spent resting rather than with family; however, that had changed with the two consecutive days off work: "*You get that one Sunday to have a rest.*

It feels like you're always on the run. And when you have some time to be with family, you're in bed having a rest. So now I get to have a little bit of rest on a Saturday and then spend the rest with the family". Similarly, a participant from project 4 explained: "*Saturday you've had that time to rest up and then Sunday actually get time to do family things and you are not tired, you are not knackered. So it obviously improves your mental health as well and stuff like that and happiness*".

When participants had one day off work, they felt pressured to get 'everything done' in that day. However, with two non-work days, participants did not feel the same level of time pressure. For example, a participant from project 3 commented: "*I'm just not as time-constrained. There used to be chores early in the day off, around the house, getting this done and all that, but now there's a bit more free time to do things, take my kids to the beach. So it was like pretty much a day, and then there was no time for leisure really amongst that, or if there was, stuff gets neglected around the house*". Similarly, another participant described how having one day off had required him to 'squeeze' everything into that day, but this did not occur with a two-day break: "*Normally you just have the Sunday off you try to squeeze everything in on that one day. You try to relax a little bit and then you need to go and do things that you need to do with your family, activities or catching up with things or going to the shops, try to squeeze in everything on that one day. But the good thing about five days per week is that you can leave for example the Saturday to catch up in your house, cleaning up or organizing things and then Sunday can be your rest day where you can relax and enjoy the time off right. So having the two days off is completely different*".

3.2.5. Mental Health

Mental health emerged as an important outcome of having sufficient rest and recovery time afforded by a two-day weekend. Some participants identified that working a five-day week helped to prevent worker burnout. For example, a participant from project 5 commented: "*I feel like if you wanted to work six days, then there would be more burnout. I feel like, especially for me, if I had to work Monday to Friday and then come in on a Saturday as well, and only had 1.5 days where I'm not thinking about work, then it's not enough to come back on a Monday without feeling super lethargic and tired, and like I don't want to be here*". Another participant from project 4 had experienced burnout at a previous six-day project and therefore much preferred the five-day week: "*I've burnt myself out before trying to change the world as it were, but I wouldn't do that again*". Another participant preferred the five-day project as it was better for his mental health. He reflected on a previous six-day project where he had worked in a leadership role and insisted he would never do that again as it was not a happy period of his life: "*My thinking was I'll never do something like this again. I don't want to do it, I was not happy with the project, it didn't feel like a sense of achievement at all. There's so much that you lose. And I felt those three years, and they might look good on my CV [curriculum vitae] and everything, but those were the three worst years of my life because I had no life. I lost three years of my children's life, and I can never recover it*".

For some participants, working a six-day week on previous projects had led to stress and poor mental health which had impacted their productivity. For example, "*If you would work Saturday thinking that you are going to be more productive having a whole day, but then you only have one day for yourself. And you're going to be probably more stressed. You only have 24 h to switch off work and so you come back on Monday and you are already stressed. So I feel like mental health wise it would have an effect on you which will affect your productivity, which will make you less productive. I reckon five days is your optimum productivity*".

Some participants explained that work at their current project was effectively planned so that tasks could be completed within a five-day weekly schedule. This had resulted in less stress at work, which had led to less schedule delays. Less stress at work had also led to less stress experienced at home. For example, a participant from project 5 commented:

"*Less delays, worked out a lot better because no one's stressed trying to do way too much in a little amount of time. It's funny because no one seems to be running around like a mad person, but we're getting more done. So I think it's just better planning. I think it comes back to not being so stressed. If you can imagine not being stressed at home makes it better for when you get up and come to work*".

4. Discussion

Our research explored the impact of a re-distribution of work hours across five days to enable two consecutive days off and its subsequent impact on construction labour productivity. As much of the research to date on construction labour productivity has been undertaken from the perspectives of managers and executives [33], our research sought to address this gap by seeking out workers' perspectives on labour productivity. Consequently, our first research question examined how a five-day on/two-day off project work schedule impacted the subjective productivity of construction workers from the perspective of workers who had experienced the work schedule under study. Ostensibly, project schedules had been planned so that a six-day work week was redistributed across five days with two consecutive days off for participants. It might be expected that, since the same hours were being worked, that labour productivity would not be impacted. Our findings revealed that despite working the same number of hours across five days instead of six, labour productivity either stayed the same in some cases, or exceeded that of a six-day work week in most cases. Our second research question examined the factors contributing to subjective productivity of construction workers working a five-day on/two-day off project work schedule. Our results revealed that factors contributing to labour productivity can be grouped into two categories. The first category relates to the health and wellbeing of workers and the second category relates to work-based practices. Our results indicate, however, that workers' health and wellbeing was the most critical aspect impacting workers' productivity and supported some of the work-based practices as discussed below.

Our results align with the effort–recovery theory, which explains how the demands of work produce temporary psychological and physiological costs for workers. When workers have sufficient recovery opportunities, they are able to restore energy and return to their normal psychobiological state [25]. Participants identified that the two-day break from work provided rest and recovery opportunities, which enabled them to start work the following week feeling refreshed and productive. This contrasts with participants' experience of a six-day work week in which they reported feeling fatigued and stressed as one day off did not enable sufficient time to recover from the previous week of work. Totterdell et al. [40] reported that sleep, mood and social satisfaction were worse on the first rest day following a work shift in comparison with subsequent rest days, thereby emphasising the importance of a break from work that extends beyond one day. Our results highlight that work schedules that do not enable adequate rest and recovery opportunities can damage the mental health and wellbeing of workers by increasing demands and depleting resources [5], leading to poor health outcomes and decreased productivity.

In addition to supporting rest and recovery opportunities, the two-day weekend provided participants with choice and control over how they used their time off. Our findings show that instead of feeling time-constrained and having to spend their one day off engaged in household chores, participants were able to rest and relax as well as spending time with significant others, exercising, and participating in leisure activities. Having the capacity to participate in a wide range of activities is important as it enhances workers' health and wellbeing and contributes to productivity. Spending time with important others can be one way of recovering from work demands [16,17], and social activity during leisure time is positively associated with task performance after the weekend and has a

positive effect on health [16]. Furthermore, the relationship between job demands and task performance is positive when workers have a resourceful home life, described as experiencing a high (versus low) level of positive child-related events [41]. This signals the importance of non-work experiences and highlights how home-based activities contribute to task performance as they are an important component of responding to job demands. In addition, Du et al. [40] found that sharing positive events with significant others at home facilitated workers' functioning in dealing with job demands and further improved task performance in the subsequent work day. According to the JD–R theory, when jobs have enough resources to support demands, health is maintained. However, when job demands are in excess of the available resources, negative consequences occur, and work performance suffers [23,24], and this was illustrated in our findings.

Work-based practices also emerged as a factor contributing to labour productivity. Our findings identified that many participants had realigned or re-organized their work tasks to suit a five-day work schedule. In many cases, careful planning was undertaken on an iterative basis to ensure that all tasks could be completed within the five-day work schedule. For some participants, a period of adaptation and adjustment was required and this was especially the case for participants who had previously worked on six-day work schedules. Working efficiently, lack of re-work, less defects, and making less mistakes were deemed to increase productivity, which had helped to meet project schedule milestones. Participants explained that being clear-minded, rested, and less stressed had been paramount in working effectively and efficiently. These findings illustrate how adequate recovery supports health and wellbeing and contributes to work practices, which in turn impact on productivity.

Another work-based practice raised by participants related to work on Saturday. In Australia, construction projects have typically been scheduled according to a six-day work week [1] and it is common that Saturday is the final day of a six-day work week. Saturday was identified as a less productive work day due to being a shorter work day, having a smaller workforce, lack of worker motivation, and worker fatigue. Our findings are consistent with previous research in the Australian construction industry that shows that Saturday is usually the least productive weekly work day [42].

5. Conclusions

Although previous research has identified working long hours as being a risk factor for poor health, fatigue and reduced productivity among construction workers, relatively little research has considered the distribution of work hours across the work week. This research examined the potential benefits associated with providing workers with two non-work days each week, including consideration of the impacts on workers' subjective productivity. The research findings highlight that, while some workers perceive themselves to be working less because they are not working on Saturday, the majority perceive the productivity gains associated with having a two-day break each week to offset this reduction in work days. In particular, workers who had experienced the five-day week schedule indicated they experienced greater opportunity for rest and recovery, enjoyed more time engaged in social or leisure activities and had more choice and control about how they spent their time off work compared to when working a six-day week. This contributed to improved health and wellbeing and increased productivity. Participants also observed that, when Saturday work was not available, projects needed to be better planned to ensure work was completed in the five days available. It was also noted by many participants that Saturday is typically a low productivity day in the construction industry, further reducing the productivity impacts of working a six-day week. Other benefits observed included improved quality and reduced re-work, which was attributed to workers being better rested and more focused on their work tasks while at work. Overall, the research findings

suggest that the shift to the five-day work week did not adversely affect project productivity performance and, in fact, potentially improved it.

As our research was based in Australia, findings may not be applicable to construction projects in other countries. In addition, as subjective productivity measurement was used in this study, objective productivity gains cannot be quantified. Further research is recommended to quantitatively ascertain how a 5-day work week impacts project labour productivity.

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