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**Legalized Recreational Marijuana: Safety, Ethical, and Legal Perceptions of the Workforce**

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## Abstract

Recreational drug use in construction is an area of concern for safety managers, and the legalization of marijuana in several US states may result in increased use among workers. Experimental approaches and policy creation are not straightforward because of the problems around existing methods of drug testing for marijuana that stem from the fact that its longevity in the body outlasts actual intoxication and a lack of scientific agreement of quantifiable long-term effects on work performance. Here, a social constructionist methodology has been adopted to explore perspectives of marijuana legalization as revealed through conversations with fifty construction site workers. Findings show that although legalization has had no impact on use amongst construction workers, impairment whilst at work remains unacceptable. A conflict now exists around personal freedoms and drug testing, leading to both resignation and dissatisfaction amongst workers. This could negatively influence the development of a positive safety culture on sites, and hinder worker engagement with safety overall. It is recommended that companies and unions recognize that blanket testing policies are problematic in practice, and support the development of accurate testing for immediate impairment from marijuana use.

## INTRODUCTION

There is growing concern around the use of drugs amongst construction workers and the consequences and implications this has for safety and safety management on sites. Research of drug and alcohol use in the Australian construction industry has revealed that safety managers feel this problem is ' … a major issue that is only getting worse' (Biggs and Williamson 2012:450). This pattern is repeated world-wide, and amongst all global industries construction is an unfortunate leader in worker drug consumption (e.g. Gerber and Yacoubian 2002; French et al 2004; Minchin et al 2006; Schofield et al 2013; Bush and Lipar 2015, cited in Fardhosseini and Esmaeili 2016), with significantly higher use than that found in other high-hazard industries (Tan and Lloyd 2016) making it a pressing problem for construction safety management.

The cause of high rates of drug use amongst construction workers is itself worthy of research, and indeed such work is being undertaken elsewhere (Sherratt 2015). It has been suggested that work related stress (Bowen et al. 2013; Fardhosseini and Esmaeili 2016), psychological disorders (Wang et al. 2016), work patterns, long travel and abnormal shifts (Miller et al 2007) and remote job locations may all contribute to increased use of drugs and alcohol. Furthermore, feelings of powerlessness that come from short-term employment and job insecurity (Frone 2013) and the very nature of dangerous construction work (Biggs and Williamson 2012) can also have a major effects. These are also known social determinants of health (Wilkinson and Marmot 2003) and the reasons why people take drugs.

For the purposes of this paper, the focus remains on the symptom of drug use among construction workers rather than the potentially myriad causes. More specifically, the focus is on marijuana use because of the rapidly-changing legislative conditions in the US. This is timely because, although there is no definitive data yet available, it has been suggested that the contemporary societal shift towards the decriminalization and legalization of marijuana for recreational use, as has recently occurred in several states in the USA, will lead to an increase use overall (Englund et al 2017).

To better understand the complex personal and social dynamics associated with marijuana use amongst construction workers, and the potential consequences for construction safety management in practice, research was carried out in a setting where it has been legalized recreationally: the State of Colorado, USA. The goal of this inquiry is to better understand ethical and legal issues that have arisen and their implications on the workforce and how these wider social contexts, themselves inexorably intertwined with construction safety management (Sherratt 2016), influence and affect safety management on sites. Existing empirical research in this area is very limited (Biggs and Williamson 2012), and has previously taken a quantitative approach, seeking management and not worker perspectives (Fardhosseini and Esmaeili 2016). This inquiry presents another perspective of the problem, from the worker point of view, using a more nuanced methodological approach to contribute to a more holistic perspective and understanding of this phenomenon.

## CONTEXT

### The Effects of Marijuana

Although the impacts of marijuana use on construction safety and worker well-being are at present unknown, in contrast, there is a considerable body of research examining marijuana itself and its effects on users (Fernandes and de Campos Moreira 2011). This research exists in part because of the benefits that marijuana provides like short-term increases in relaxation, decreases in stress, and increase in appetite (Hill 2015). Indeed for some construction workers, use of legalized marijuana may be beneficial in the same way that many patients have benefitted from medicinal marijuana for years. In this study no presumptions are made about the net positives or negatives of marijuana use, but it is recognized that being high at work is unacceptable.

Marijuana is a natural product, and its potency varies with both the type of marijuana, as active cannabinoids within the plant can vary in concentration from 0.3-30% (Fernandes and de Campos Moreira 2011) and how it is ingested by the user (Huestis 2007). At present there is little scientific agreement of quantifiable effects of marijuana (Caulkins et al 2015). Instead, research has demonstrated that use can result in various combinations of symptoms including: dizziness, tachycardia (accelerated heart rate), psychomotor retardation, alterations to perceptual and motor speeds and coordination (Fernandes and de Campos Moreira 2011). Marijuana has also been found to cause cognitive impairment (Caulkins et al 2015:35) with long-term users potentially developing problems around intelligence quotient (IQ), reaction time, attention, loss of memory and becoming prone to knee-jerk reactions (Fernandes and de Campos Moreira 2011). However, the impacts on such cognitive functions are also difficult to quantify due to the difficulties of segregating marijuana use from the user's natural functionality (Caulkins et al. 2015:33). A rough 'time-line' of impairment has been established with peak concentration of the drug coming 10-30 minutes after inhalation. It is then stored in the fatty tissues of the body, and from there it is slowly released and metabolized (Fernandes and de Campos Moreira 2011). The effects last for about 3-5 hours, after which the influence on physiology wear off and the user gradually returns to their normal non-influenced state (National Highway Traffic Administration 2015).

**Marijuana and Construction Safety Management**

From the above, it is clear why impairments of these kinds are highly undesirable for workers in many industries, including construction. Construction is a dynamic, high-hazard industry (Pinto et al 2011), and a key tool in construction safety management is a rigorous hazard identification and risk assessment processes supported by active worker engagement to monitor this process as the construction site and its hazards change on a daily basis (Sherratt 2016). Although empirical work in the construction industry is lacking, studies in other sectors have been able to correlate impaired co-ordination due to drug use with a reduction in worker ability to perceive and respond to hazards (Miller et al 2007). For example, evidence from controlled laboratory trials demonstrates that ' … marijuana use reduces psychomotor performance in ways that increase overall risk of accidents, and in particular, impairs driving (e.g. Ramaekers, et al 2004; Ramaekers et al 2006: cited in Caulkins et al (2015:33)), which can not only be directly linked to construction plant operations but also the use of other machinery and tools on sites, and is therefore a significant concern for construction safety management.

Although it has often been suggested that any substance use creates a safety risk to the user and those around them (Miller et al. 2007), this viewpoint is equivocal and there is no empirical research that has demonstrated causality between drug use *outside* of work and occupational injuries and illnesses. Caulkins et al. (2015:xii) state that current literature 'is insufficient to determine the extent to which marijuana use is casually linked to any of these outcomes', whilst some researchers have suggested there is no correlation at all (e.g. Pidd and Roche 2014). Frone (2013) goes further and argues that the correlation of drug use, cognitive and psychomotor performance to work safety is not only unconvincing, it is also to some extent prejudiced.

With specific regard to safety management within the construction industry, the proportion of construction site accidents directly attributable to marijuana use remains unknown (Biggs and Williamson 2012). However, when the complexities and constant change found on construction sites is considered, alongside the need for diligent hazard and risk management within that context, the potential for any such impairment amongst workers with regards to hazard perception and risk–taking becomes a negative influence on good safety practice. Clearly, further research is needed to contribute to this discussion.

### Marijuana and Drug Testing

Given the high prevalence of drug use amongst construction workers (Tan and Lloyd 2016), and the potential problems of impairment within such a high-hazard context, many construction companies and worker unions are increasingly operating Drug-Free Workplace (DFW) Programs. These programs often involve worker education, assistance such as detox programs, and drug and alcohol testing of the workforce. Testing can be carried out pre-employment, post-accident, randomly, because of reasonable suspicion, or some combination of all four (Schofield et al 2013). The implicit goal of testing is to deter substance abuse amongst workers and avoid hiring applicants who use drugs (Minchin et al. 2006). Drug testing has been a cornerstone of many American safety programs for nearly 20 years (Maloney 1988).

Although testing programs have been associated with reductions in safety accidents, direct causality of their effectiveness has not been empirically proved. For example, Schofield et al. (2013:99) found that construction companies using drug-testing programs generally exhibited lower injury rates than companies not using drug testing programs, with results varying by trade and injury types. However, these results were not statistically significant. Waehrer et al. (2016) also established that drug testing was only effective to lower minor injury rates with no lost-work, but no such relationship with lost-work injuries could be established. The much-quoted work by Gerber and Yacoubian (2002) found that construction companies with drug testing programs experienced a 51% reduction in incident rates within two years of implementation. Yet this trend did not continue to improve beyond the first few years and the authors were careful to present this statistic as an association with no claim of causality. Unfortunately, the work has been misinterpreted as implying causal inferences since. Indeed, Gerber and Yacoubian (2002:67) twice reiterate in the conclusions to their work that 'drug testing does not, in and of itself, constitute a drug-abuse prevention programme…only one component.’ In fact, it is highly probably that the introduction of a new safety-related program, whether educational or simply involving drug and alcohol testing, reorients the workplace to safety, which then in turn sees improvements in practice. This cyclical relationship in safety management has been established by Lingard et al. (2017), where any intervention can generate consequential safety improvements on construction sites, later followed by an increase in safety failures as the worksite reverts to 'normal' practice. Indeed, ancillary benefits to safety have been found with many different types of intervention, as Goldenhar and Stafford (2015) found with 'stretch and flex' programs originally introduced for worker health, which saw unintended improvements in many other areas, including safety. This hypothesis of beneficial consequences around intervention is also acknowledged by Miller et al (2007:566), Schofield et al (2013) and Wickizer et al (2004:107) throughout their DFW research.

The technologies for testing for marijuana differ significantly from those used to detect other drugs due in part to the considerable longevity of marijuana in the human body that creates an additional confounding factor unique to the substance. This causes an issue because users may test positive long after the effects of marijuana subside. From initial consumption, either through smoking or ingestion (i.e., using edibles), it has been established that the effects last for about 3-5 hours, after which the influences on physiology wear off, and the user gradually returns to normal (National Highway Traffic Administration 2015). However, although the active ingredient in marijuana (tetrahydrocannabinol known as THC) creates the impairment, testing methods do not test for THC and instead they test for one of the cannabinoid metabolites. This chemical, called C-THC, is actually generated as the impairing effects of THC are wearing off, and has a much longer life in the body than THC itself, yet does not itself cause any impairment (Huestis 2007). The duration of this process varies from person to person, depending again on the marijuana strength, frequency of use and the individual's physiology, and can take over 30 days. Therefore, a positive test for marijuana (e.g. through a urine test) only indicates that drug exposure has historically occurred, and is not confirmation of current impairment (Huestis 2007). There is not yet a set of accepted quantitative metrics that correlate a level of THC or its metabolites to the more familiar measure of blood-alcohol.

### Problems and Conflicts

Marijuana is arguably the most complicated drug for the construction industry to manage, and perhaps as a direct consequence of this many US employers and unions have simply adopted blanket policies where no marijuana use is acceptable, citing Federal law under which it remains illegal (Halverson 2013).

However, the dissonance between DFW testing programmes, the way marijuana use is determined by current testing technologies and its legalization in some states for recreational use has the potential to cause inconsistencies and problems on sites. For example, there is a clear conflict between DFW programs seeking to prevent immediate worker impairment on site, and the way marijuana remains within the body long after use. It could even be suggested that workers, well aware of the flaws in current testing technologies, may actually seek out other illegal and more potentially harmful substances over the weekend, simply to avoid returning a positive test from marijuana on Monday morning when they return to site. There are also further ethical considerations. Any physical testing of workers is arguably a violation of privacy and autonomy (Sherratt 2015), and particularly relevant when the findings relate to a substance which has been deemed socially acceptable for public use and consequently legalized. Yet, testing is likely to continue, as companies with established testing programs often receive discounts on their worker compensation insurances, and commercial drug testing itself is a multi-million dollar industry (Wickizer et al 2004).

Perhaps of greater concern is the potential for a positive marijuana test to provide a simple 'root cause' for any worker accident, despite the fact that a positive test is not confirmation of impairment at the time of the accident, only of historical use. Although worker impairment must be recognized as a potential factor in site accidents, and should not be tolerated by managers or peers, testing can create a simple 'blame the worker' situation while more complex problems of poor management remain hidden. This also has the potential to lead to an avoidance of reporting and concealment of incidents for fear of the consequences (Miller et al. 2007; Schofield et al. 2013), including the negation of any compensation payments should a worker test positive after an accident. Such simplistic accident reporting is also likely to limit accident investigation to the superficial, curtailing organizational learning opportunities (Hale and Borys 2013). Such a dissonance does not support the development and evolution of organizational safety, creating barriers to worker engagement, limiting the establishment of a just culture (Dekker 2007) and ultimately the contributions both elements can make to improvements to safety in practice.

## METHODOLOGY

There are several complex and interrelated factors related to marijuana use and construction safety that yield ethical, moral, and scientific questions. For example, a debate is still ongoing as to whether accident causality can ever be truly proven (Hollnagel 2014). Thus, the proposition that drug testing is a preventative tool (Schofield et al 2013:99; Gerber and Yacoubian 2002:67) may never be validated, which yields the argument that there is no way to ever know if marijuana use or drug testing causes an increase or a decrease in safety performance.

Whilst overcoming the technological problems around testing for the chemicals that actually cause impairment is best left to science, it must be acknowledged that this is also a construction safety management problem, one that has the potential to influence worker engagement and safety culture on sites. But it is also a messy and complicated phenomenon, and so a research approach that allows for complexities, inconsistencies, and incoherence in its findings is therefore proposed in order to answer the research question: ‘what are the impacts of the legalization of marijuana for the construction site workforce?’

### A Social Constructionist Approach

A social constructionist approach grounds itself in a relativist ontology, accepting that the world as experienced is socially constructed by the people within it through their interactions, systems and practices (Gergen and Gergen 2004). This results in shared versions of 'knowledge' within particular communities and the ‘truth’ simply as the currently accepted way of understanding that particular world (Burr 2003). Such an approach inevitably challenges traditional positivistic conceptions such as validity, replaced here by credibility (Lincoln and Guba 1985) as demonstrated through persuasive coherence and robust argument (Taylor 2001). The approach also challenges traditional notions of reliability, which is demonstrated here through standardization in the data collection, transcription, and constant comparison during the analytical process (Gibbs 2007). The exploration of these shared versions of knowledge is achieved by illuminating the dominant discourses (Taylor 2001; Burr 2003) associated with the phenomena.

According to Paltridge (2013) ‘discourse is one of the most significant concepts of contemporary thinking in the humanities and social sciences as it concerns the way language mediates and shapes our interactions with each other and with the social, political and cultural formations of our society.’ Essentially, discourses both shape and reveal the ways people see and understand the world. For this study, discourse analysis has been used to explore and unpack the data and reveal the ways in which marijuana, legalization and impairment are currently understood within the context of two large US construction sites.

### Sample and Method of Data Collection

Previous research exploring drug use and the construction industry has focused on the opinions or attitudes of employers, human resource personnel or safety managers (e.g. Gerber and Yacoubian 2002; Fardhosseini and Esmaeili 2016). Yet, as Miller et al. (2007:570) state, informal norms take precedence over formal policies, and so any real insights are likely to come from the site workforce rather than the corporate offices. The data presented here were collected from two construction sites in the state of Colorado where marijuana was legalized for recreational use in 2012. Participation was on a strictly voluntary basis and workers were free to terminate their involvement if they wished at any time. The two fieldwork researchers spoke with a total of fifty native-English speaking workers, foreman and site-based supervisors, who represented various trades and organizations.

A series of questions were used to stimulate conversation, specifically designed to standardize the collection process whilst still enabling the construction workers to lead and develop the conversation on their own terms. The questions help focus discussion on the central topic of the issues around marijuana legalization and construction work. The researchers took care to facilitate this organic process, which naturally enabled the dominant discourses to emerge during the course of the conversation.

The questions used were:

1. What are your feelings about the legalization of recreational marijuana in general?

2. How has the legalization of marijuana changed your workplace?

3. Marijuana is known to cause impairment. Is this an issue in the site workplace?

4. How would you compare the use of marijuana to the use of other drugs and alcohol?

5. What do you think about employers testing for marijuana use?

6. Do you think anything special needs to be done to manage the potential workplace impacts of marijuana use?

7. What could be done to better manage impairment in general? Whilst on site?

8. Is there anything else you would like to add?

The conversations were digitally recorded in the field, with the full agreement of those taking part. Discourse analysis involves the immersion of the researchers within the data throughout the research process, and therefore begins during the data collection. In this study, the two researchers were able to discuss the data during the process of its collection, and were therefore aware of the growing prominence of certain discourses over time. This enabled a rough consideration of 'saturation' (Kumar 2005) to be made during data collection; the state at which no new insights were being revealed from the empirical data, something later confirmed during the later transcription and analysis of the data away from the field.

**Method of Data Analysis**

The method of analysis used was discourse analysis which ‘…considers the ways that the use of language presents different views of the world and different understandings … It examines how the use of language is influenced by relationships among participants and the effects that the use of language has upon social identities and relations’ (Paltridge 2013:2). Therefore, it is an appropriate method for this exploratory examination of the complex phenomenon of legalized marijuana. The specific method of discourse analysis adopted here was *discursive psychology* (Potter et al. 1990) as there was a need to focus on people’s everyday practices and how they relate to a larger societal structure (Jorgensen and Phillips 2011:60). Within discursive psychology, interpretation is the key analytical activity (Wetherell et al. 2001); however, to be true to the foundations of this approach, there is the need to ensure that the discourse is approached as an interaction rather than a route to externalities such as attitudes or cognitive processes (Potter and Wetherell 1992).

The first step in the analytical process was to transcribe the audio recordings using Jefferson Transcription (2004). This is a transcription method which not only captures *what* was said but also *how* it was said. Notations within the transcripts able to reveal (among other things) pauses, emphasis, speed, redirection and repositioning as expressed in the talk itself.

An excerpt from one of the interviews with Jefferson transcription can be seen in Fig. 1:



**Fig. 1.** Jeffersontranscription excerpt

In this extract the speaker expressed their frustrations with the company drug-testing policy as demonstrated through the emphasis within the transcription, illustrated by underlining representing emphasis, ‘greater than’ and ‘less than’ annotations representing speed, and the upwards arrow representing rising pitch, as well as their prioritization and positioning of testing within more general talk about marijuana legalization. Such a high level of detail is critical to allow full analysis of the discourses (Potter and Mulkay 1985; Potter and Hepburn 2007) and is able to generate findings that are more nuanced and insightful than other qualitative data analysis approaches such as simple thematic or content analysis.

Following transcription, the data were coded. Although there is no predetermined protocol when performing coding within discursive psychology (Peräkylä 2005; Gibbs 2007) the coding was driven by the data to be as inclusive as possible to allow major themes, ideas and interpretations to be identified. However, these categories collapse and expand within the constant comparison method (Silverman 2001), and indeed various coding categories were developed or removed as the process continued (Wiggins and Potter 2007). Examination was made both within and between the transcripts during the analysis, and this analysis was intrinsically linked to the coding process through shared development, as the analysis progressed through constant comparison. This approach ensured that multiple, repeated passes were made of the coded data (Taylor 2001) resulting in a high level of researcher familiarity and confidence in the processing of the data, also ensuring the validity and accuracy of the findings as they emerged. Systematic investigation is essential to ensure rigor within the analytical process (Taylor 2001), and although discourse analysis is an interpretive process (Wetherell et al. 2001) and the researchers skill in the identification of patterns and variations is itself critical (Potter and Wetherell 1992), this subjective dependence was compensated through the use of two researchers, able to provide inter-reader reliability. The analytical process was carried out manually and involved both highlighting and detailed notations on the various transcripts, which in turn fed into the development of a visual ‘mapping’ of the discourses. This approach enables the analysis to be a highly flexible, even convoluted practice, which is then refined and consolidated as the data is repeatedly visited and re-visited through the constant comparison process (Gibbs 2007).

The discursive analytical framework highlighted key themes which were then again reconsidered within a holistic interrogation of the data, and systematically examined through a variety of lenses. A large variety of patterns were sought (Taylor 2001; Wildemuth 2016): patterns of variability in terms of consistency and inconsistency, patterns of emerging themes or representations, and patterns of nuance, contradiction and repetition (Wildemuth 2016). The flexible coding approach allowed for patterns to develop or disappear as the process continued (Wiggins and Potter 2007) which ultimately resulted in the need to focus on some patterns at the expense of others (Taylor 2001). The key themes or discourses to emerge from the data analysis as a whole were: legalization as a non-event, positivity, negativity, privacy and personal business, impairment intolerance, collegiality, testing as compliance, testing as punitive, resignation, dissatisfaction and unfairness, and conflict. The final step in the analytical process was to reflect on these findings within the context of the data as a whole, testing for ‘fit’ and confirmation that they were indeed valid and representative, with attention paid to the logic of these findings within the specific context under examination and the conclusions they subsequently generate (Coyle 2000; Wetherell and Potter 1987).

The findings of this research are presented here through the dominant discourses as revealed by the aggregated data. Dominant discourses are those most prominent within any data set, and in this instance data was collected to saturation, thereby demonstrating the validity of these findings. These dominant discourses have been set out in narrative form, as is common for the presentation of this method of research, to enable the nuances, interrelationships and conflicts between them to be clearly explicated. In instances where extracts and quotes are used they are representational rather than anecdotal, and have been re-transcribed from the Jefferson transcription to better illustrate rather than replace any analysis. These findings are interwoven with discussion, enabling consideration of the theoretical alongside the empirical, as the 'truths' about marijuana, legalization and impairment within these construction site contexts are explored.

## FINDINGS AND DISCUSSION

### The non-event of marijuana legalization

Construction workers use drugs - whether they are legal or not. The use of drugs, including marijuana, is something readily acknowledged, even accepted, by the construction workforce. As one worker put it, ‘the construction industry, it’s like the rock and roll business, it lends itself to drugs and alcohol.’ Perhaps as a consequence of this wider context, the dominant discourse associated with the impacts of marijuana legalization on the construction workforce is actually one of total inconsequence: there has been no change, it simply hasn’t made any difference at all. As one worker explained: 'people that have used it have always used it, whether it's legal or illegal they still use it'. Despite some variations in the discourse as predicted by the literature, such as concerns of increased use amongst workers following the legalization, in all cases these concerns were then directly associated with a shift back to the dominant shared understanding on site: that there has been no real change in use.

### A positive perspective of marijuana

A common development of the discourse was one of positivity around the legalization, with medical use and benefits in terms of generated tax revenue for the state drawn upon to support the acceptance of the legal change. As one worker said: ‘[it] helps our state, helps our schools.’ An unexpected finding was the frequently shared understanding that the construction industry in the State of Colorado had, as a whole, actually benefited considerably from marijuana legalization. Workers associated increases in the volume of local construction work with the change in legislation as something that was attracting more people to come and live in the state. As one worker claimed: 'you've got more people coming here, you need more houses, you need more hospitals, you need more schools'. This pragmatic and positive association by the workers from a workload perspective was more prominent in the data than any associations with increases in risk or unsafety on sites.

Positivity was dominant within the general discourse as a whole suggesting support for, conformity with, or at the very least acceptance of, the wider changes in social and cultural attitudes that have culminated in the legalization. This discourse developed through a number of different aspects. For example, a ready association was made between marijuana use and the principles of individual choice and privacy, and marijuana use outside of work was deemed to be no one else's business but your own. However, as should perhaps be expected, the discourses of positivity and privacy were also supplemented by an alternative albeit far less prominent discourse of disapproval, closely associated with religious (specifically Christian) or moral contexts. These few workers readily positioned themselves as a minority, as ‘others’ within the construction workforce, in turn reinforcing the dominance of the positive discourse of acceptance and approval. Such a finding not only serves as evidence of the lack of homogeny within any sizeable social grouping, but it also reinforces our awareness of the role such fundamental aspects of human existence still play within our contemporary world.

### Zero tolerance of immediate impairment

Despite these positive perspectives, there was a common understanding that construction workers do use drugs. As one supervisor noted, ‘people are high right now.’ The overriding discourse around worker impairment during work was one of intolerance and unacceptability. This discourse developed around strong negative associations with immediate impairment. As one supervisor noted ‘ [it’s the] same thing if you were drinking… go home and have a beer, go ahead, go home and smoke a joint, go ahead, but not on the way to work, be sober when you get here.’ Although the location of many of the interviews was out on the site amongst working machinery, and so may have reinforced the immediacy of worksite hazards, the general dangers of working in construction remained a constant presence throughout the data as a whole. As one worker said: 'if you’re not one hundred percent here at the job site there’s a risk, especially on construction sites there’s a risk for danger'. Construction workers are well aware of the potential for injury on site and some told stories relating to their specific trades and the safety consequences if their type of work was not carried out correctly, including hazards such as electrocution or high-pressure explosions. As one worker put it, ‘you can’t work high, you screw up, you can’t work drunk either’. Through such positioning of immediate impairment as a serious negative impact on safety, a strong dominant discourse of intolerance and unacceptability of drug or alcohol use at work emerged.

In addition, within the wider discourse, aspects of collegiality and social concern were found to supplement that of individual safe practice. As one worker stated: 'everyone wants to go home to their family safe without having some jackwagon come in all high and jeopardize everyone'. In their considerations of danger, the workers referenced both themselves and their co-workers, readily able to consider the site workforce as one team. This finding suggests there would be a ready acceptance of peer-based workplace drug prevention programs within the construction workforce, such as the bespoke PeerCare program developed for the transportation industry, analyzed by Miller et al (2007) and found to be cost-effective in practice. This workforce collegiality is to be welcomed within any considerations of safety.

It should be acknowledged that this discourse of intolerance to the use of drugs on site by workers was very limited in specific associations with the legalization of marijuana for recreational use. Instead the dominant understanding remained that, as one worker put it, ‘the people who are going to smoke weed at work have already been doing it before it was legalized’ and use on site was frequently positioned as neither a new nor particularly surprising phenomena. As noted above, there was some consideration of how legalization may have resulted in increased use, yet the consequences of this when such specific associations were made were minimal. For example, as one worker noted: 'I’ve been more careful myself just because of the thought that it could possibly have somebody high out here …it’s not really that much, just stay an extra few feet back from the piece of equipment'. Such minimization of any realizable danger is common within all worker discourses around safety (Sherratt 2016) and such associations were not prominent within the data as a whole. Despite such resignations and concerns about workers using drugs on sites that the dominant discourse within such discussions again remained one of intolerance, collegiality, and shared safety was a welcome finding. This could be considered a manifestation of the emergence of a robust ‘safety culture’ within the workforce, evidence of how such shared understandings can contribute to social norms.

A further finding worthy of note was that this discourse of impairment intolerance was not closely associated with marijuana. Rather, it was more frequently mobilized in discussions of the use of other drugs amongst construction workers. Most dominant was the positioning of alcohol as far worse than recreational marijuana. Contextualized through either its immediate effects, next-day consequences or long term health problems, recreational marijuana is considered by the construction workforce as a far 'lesser evil' than alcohol. As one worker said, ‘I’d rather work with a guy that’s been smoking all night than a guy that’s been drinking all night.’ The intolerance of alcohol use was equally prominent in the data. This discourse also developed beyond construction work with reference to wider social aspects, for example as one worker said: 'I’ve never met anybody that went and smoked a bowl and went home and beat their family'. Furthermore, the benefits of recreational marijuana were also often juxtaposed with the understanding that there are no such benefits for alcohol use as compared to the known medical uses of marijuana.

### The practicalities of testing for marijuana

It must be recognized that the shared understandings of marijuana impairment and the acceptance of its use will also be influenced by the inevitabilities of drug testing. As is typical in the United States, all the workers on the case study sites could be subjected to drug testing at any time from a number of sources; random testing from the main contractor, their own company, their union, or post-incident testing should an accident occur. They also understand that they would likely be immediately dismissed for a positive test result. As one worker said ‘with UAs [Urine Analysis drug tests] you’re out, no questions asked.’

There was notable variation amongst the workers as to their representations of how drug testing for marijuana works, with specific regard to the ability of the technology to make the distinction between impairment and historical use. There was even a hope that there was some way for this to be determined. Ultimately, two distinct discourses, with their own distinct ‘voices,’ eventually emerged around testing.

Firstly, there was the voice of 'compliance', which positioned testing as a valid management tool and did not acknowledge, or even wish to acknowledge, the problematic nature of marijuana testing. As one worker said: 'if you test hot, you’re fired, the longevity, either thirty days or forty days it stays in your system - that means you shouldn’t’ve been doing it'. This voice did not mobilize any positivity around marijuana use. While the discourse of intolerance to impairment was often built upon and developed here, this was often done in a way that contradicted the practicalities of the testing system and its consequences for workers. There was no collegiality among the workforce team, which itself creates a notable inconsistency within the wider safety discourse.

This voice was generally mobilized by those who also did not approve of the legalization of marijuana for recreational use; however, this was again not a homogenous association. Even those who were positive towards the legislative change still noted that ‘the rules are the rules’ and it was just ‘too bad’ if people were caught out by the testing. Yet this understanding must also be placed within the context of employment law in the US. Worker rights vary from state to state and for some workers company policy simply is the law, as employees can be fired 'at-will' with no notice or cause required. As this voice of compliance was heard within the data, it could also, perhaps unsurprisingly, be associated with an emerging discourse of resignation grounded in the legalities of such employment practices. As one supervisor noted: 'apparently it’s not against civil rights here, and I think if that’s the company’s policy, as long as the employees know going in to it, then that should just be an accepted fact'.

Secondly, there was the voice of concern that positioned testing as problematic. As one supervisor said, it’s a: ‘can of worms….it creates a grey’. Those who mobilized this voice were well aware of the technical issues with testing for marijuana, familiar with the longevity of marijuana in the system and the potential to test 'hot' a considerable time after use and when impairment had 'worn off.' It is perhaps worthy of note here that this second voice was the most prominent within the data as a whole, and testing for marijuana was positioned as problematic, divisive and unfair by the majority of the workers. The conflicts between marijuana legalization and drug testing were frequently constructed through scenarios or stories. As one worker said: 'you could have a couple beers, you could have a smoke, and then on Monday you wouldn’t fail an alcohol test but you would fail a marijuana test', but also more succinctly: as one worker put it ‘that’s the kicker there…that’s kinda the problem with marijuana you know.’

Likely due to their wider safety management responsibilities within the site environment, supervisors also associated these concerns with accidents and incidents on site. Although this was not as prominent within the discourse overall as the literature and theory suggested. Again, this was deemed as problematic and most closely positioned with the practice of accident and incident investigation. As one supervisor said: 'some guy could’ve gotten high two weeks ago and then just had an accident, but it’s still going to show up in his UA-his urine analysis, it makes it difficult.' Associations with the consequences of accidents and testing were very limited amongst the front line workers, with only two workers drawing on such a scenario to develop their considerations towards the workers compensation system and how a positive test could negate any payment. This could be a manifestation of the reluctance of construction workers to ever consider themselves vulnerable to an accident as revealed in other safety discourse work (Sherratt 2016). There was an unspoken acceptance of the inevitabilities of the system; as one worker asked: 'what are you gonna do? Insurance is insurance, you know, not much you can do about it'. This emergent resignation was supplemented by an acceptance of the scientific problems around drug testing, closely associated with the desire that better or more accurate testing would soon be developed, as one worker said: ‘they need to come up with a better test that shows whether you’ve got it in your system now’ yet this was not itself positioned as a problem for the construction site to solve itself, as another worker noted: ‘that’s above my pay grade’.

### Resignation and conflict

Perhaps unsurprisingly, resignation emerged as one of the dominant discourses associated with drug testing and legalized marijuana amongst the workers. There was resignation with US employment law, the inaccuracies of the test, or with the need for compliance in case of an accident. A frequently mobilized scenario was that, should any testing occur people would get caught and inevitably fired. This itself is reflective of both the realities of consumption amongst the workforce and site life. As one supervisor said: 'any time we could have a random UA [Urine Analysis] and people would lose their jobs'. This resignation was spurred by the fact that drug testing was commonplace before the legalization and increases in drug-test related firings are likely to be a consequence of an increase in testing. Indeed, one supervisor immediately associated testing with ‘more guys failing that you have to lay off’ whilst another told the story of losing his entire work crew to an early morning ‘stop-work’ random UA test.

Dissonance between how legalized marijuana, construction work, and drug testing policies and practices are currently working developed at times into conflict. This is a management issue closely associated with constraints to the development of any kind of just workplace culture, itself necessary for improvements in safety performance and practice (Dekker 2007). Rooted in a shared understanding of unfairness, something noted throughout this analysis was that conflict grew and developed in a number of ways. For example, drug testing was positioned as a problem only for site workers. As one worker asked: ‘Who tests the legislators? Who tests the bosses?’ Such divisions between management and workers clearly contradict contemporary safety management thinking in which leadership, worker empowerment, and engagement are critical for safety success, and are unlikely to be fostered alongside such acrimonious relationships. Another development of the discourse involved the positioning of the continued use of inaccurate testing and blanket no-drug policies as active discrimination towards those who wanted to use marijuana legally. As one worker said: ‘we can but we can’t.’ This is likely to be a growing discord as more states in the US and other countries continue to legalize marijuana for recreational use, adding both strength and weight to these constructions of unfairness and conflict.

Another aspect of the discourse that could also be associated with conflict, although more subtly, was the understanding that inflexible and unfair management approaches could actually be causing more harm to workers than the use of recreational marijuana itself. Stress, itself a form of impairment, was positioned as a direct consequence of company policies. As one worker noted they: ‘added stress… [workers have to] break the rules of their employment to use recreationally or medically’. This understanding was closely associated with the discourse of concern around testing. As one supervisor noted: 'if one was to choose to use marijuana and were to work for a company that did random testing, I think that’d be the chance you’d take'. Workers’ fear of coming to work afraid they may be tested and fired is unlikely to facilitate the creation of a happy, stress-free and harmonious workforce. Scenarios were also developed by workers around the inadequacies in marijuana testing that meant workers would use other, more dangerous substances. For example, as one worker said: ' it kinda pushes people to do more hard drugs like cocaine and things like that,’ with the potential for more serious consequences both for site safety and long-term worker health, but allowing workers to test clean on the job. Construction companies and unions may be directly influencing such behaviors, which is likely to enhance worker dissatisfaction with the current testing system and create frustration and conflict around current safety management practices. There is also the possibility that this discourse can in turn also affect wider safety management practices, in precisely the opposite way found with positive safety interventions. If workers are disillusioned with this specific management practice it has the potential to taint safety management on sites as a whole (Sherratt 2014).

A further emergent discourse was that associated with personal freedoms. Although able to hold influence with work and in the workplace, freedom is also grounded in much wider societal understandings. Again, associated with fairness, or rather unfairness, the construction workforce readily positioned what people do ‘on their own time’ is considered to simply be their own choice, and ‘their business.’ Yet, this is where marijuana causes a fundamental conflict. As one worker noted: 'it's hypocritical that somebody can go home and drink eighteen beers and come to work the next morning at five o’clock and run a crane, but can’t smoke dope once a month.' For the autonomous construction worker, it could be suggested that the former will come to dominate the latter, drawing as it does on wider social implications than the construction site itself. Despite the current temperance of resignation, this may well lead to increased dissatisfaction amongst the workforce in the future. As one worker noted: 'if they’re gonna legalize it, you know it’s gonna be like alcohol or anything else, as long as they’re using it on their own time.’ The problem is of course that you can't use marijuana 'on your own time' and still pass a drug test, and the need for accurate testing for immediate marijuana impairment, as also recognized by the site workforce, remains a key finding of this study.

Such conflicts and resignations often go unvoiced due to the ways marijuana is discussed, or rather not discussed, on construction sites. The majority of workers and supervisors positioned marijuana use as simply a ‘non-topic’ of conversation, despite its legalization. Differences in legalization and policy at Federal, State, union, and company levels mean that, as one supervisor noted: ‘it’s still not discussed, because it’s still against company policies to use marijuana.’ Where marijuana was a topic within safety briefings, it was simply positioned within a ‘do not use’ scenario for workers. However, when the findings of this analysis are considered, it is clear that the legalization of marijuana should definitely be a topic for conversation on sites. This should be done both formally and informally and certainly within safety meetings and tool box talks. Open and honest communication is another vital aspect of safety management in practice. If this phenomenon is not discussed with the workforce, it is likely that company management and safety officers remain unaware that such issues may even exist.

## CONCLUSIONS

Construction workers’ opinions on marijuana use have not changed dramatically since the legalization, and are generally positive towards the societal shift to legalized recreational use. The workers know that some construction workers do use marijuana and have always done so, whether it was legal or not, and remain concerned about worker impairment through any substance use, which is simply not tolerated on sites. There is a strong collegiate understanding around intoxication and the unacceptability of working whilst under the influence of anything, drink or drugs, and how individual impairment can impact both the safety of the individual and the workforce as a whole. This finding is considered to be very positive, and suggests that peer-based programs and interventions for alcohol and drug management amongst the construction workforce may well prove successful. This is a recommended area for further research and a consideration for practice.

Collegiality becomes divided when drug testing is considered. Drug testing has been promulgated by both academics and practitioners as a positive, beneficial, and easy solution to manage worker drug use on sites. This study, however, has demonstrated that testing for marijuana, under its current scientific mechanisms, is actually one of the biggest problems. There are workers who positively support drug testing despite its failings in identifying immediate impairment, and others who are more resigned to the fact that company policy will dictate their employment terms. Yet, there are also those who draw on discourses of individual privacy and freedom of choice, who consider marijuana to be far less harmful than alcohol, and for whom the unfairness of a flawed testing policy simply creates conflict and dissonance. It is also worthy of note, that company policy could be encouraging workers to take harder drugs or become stressed by the possibility of testing. There is currently a balance between resolution and dissatisfaction. However, this balance may well shift in future, and even now is likely to influence safety management in practice and limit the development of a just culture on sites, create tensions between workers and management, limit incident investigations, and even potentially hinder worker engagement with safety overall. This balance should be duly acknowledged by those managing safety within this environment and measures for mitigation, such as robust and transparent incident investigation processes alongside open dialogue and communication with workers to maintain safety engagement and encourage the development of a just culture, should be prioritized.

More fundamentally, the repeated loss of skilled workers to a flawed test should perhaps catalyze construction companies and unions to support the development of more robust testing technologies. It cannot be to the benefit of companies to lose trained and skilled workers to a test that does not prove immediate impairment or, in this context, anything even illegal. Given the current shortages of skilled construction workers, this seems a self-defeating policy and should be carefully reconsidered by managers at a strategic level.

Although these findings are from a social context in which marijuana is legal for recreational use, they are also able to inform practice and policy in countries where it remains illegal, as it is highly likely that construction workers there are also partaking. Construction workers across the world are therefore vulnerable to the phenomena illuminated here, and given societal trends towards legalization of marijuana for recreational use, these findings should be carefully considered by the global construction industry in the future development of any drug-management programs.

## DATA AVAILABILITY STATEMENT

Data generated or analyzed during the study are available from the corresponding author by request. Information about the *Journal*’s data sharing policy can be found here: <http://ascelibrary.org/doi/10.1061/%28ASCE%29CO.1943-7862.0001263>.

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