2021 INTERNATIONAL WORKSHOP
Cairo, Egypt, July 27-28, 2021

LADR Workshop: Book of Abstracts

Track D

A Workshop of the *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, in collaboration with the ASCE Construction Institute

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Jun 14, 2021

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* As approved by reviewers /Latest abstract under consideration

ONTOLOGY FOR LINKING DELAY CLAIMS WITH 4D SIMULATION TO ANALYZE EFFECTS-CAUSES AND RESPONSIBILITIES

(LADR-673; In Press)

Michel Guevremont and Amin Hammad
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Visualizing and analyzing the specifics of delay claims in relation to effects-causes, and assigning responsibility are a challenge for attorneys, jurists and judges. 4Dsimulation can be considered as a part of a claim management system for representing the responsibility and impact, and can be used as the main scheduling methods of claims resolution. Building Information Modeling (BIM), 4D simulation, delay effects and causes (DEC), and claims are knowledge domains with active research in the construction industry, which are individually described in the literature using taxonomies and ontologies. However, there is a gap in integrating these ontologies in a more formal and overarching ontology-based approach to grasp essential concepts such as liability, causality and quantum in a delay claim using 4D simulation. This article proposes a new method for using 4D simulation for visual analytics of delay claims based on an integrated ontology (called Claim4D-Onto), which includes a taxonomy of the quantum, causality, and assigned responsibility. A case study is used to demonstrate the benefits of the proposed method. This method can provide a promising multidisciplinary tool for quicker and fair settlement of construction delay claims by facilitating hearing procedures and catalyzing pre-trial negotiations.

MODELING WITH FUNCTIONS FOR CUMULATIVE IMPACT OF CHANGES

(LADR-727; In Press)

Tong Zhao
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Industry has recognized that cumulative impact of changes is a possible factor affecting labor productivity. It is the ripple effects of those changes, which it may be impossible to readily capture in the discrete effect of individual changes. It can be disruptive and detrimental to labor productivity, if it negatively impacted resources, working conditions, and/or means and method. Various researchers attempted to investigate the cumulative impact of changes in a quantitative way, and some regression curves for the relationship between labor productivity and project change were developed based on statistical analyses. The reliability of the curves is in question for the representativeness and reliability of the data, but major flaws with these regressed curves are associated with the form of the trendline functions, which are elaborated in this paper. This paper presents the corrected form of trendline function with mathematical justification. The corrected form of trendline function is then further validated with published data. Findings presented in this paper can help provide valuable insight in determining the relationship between labor productivity and changes, and resolve issues related to cumulative impact of changes.

LITIGATION RISK TRANSFER MECHANISMS IN CONSTRUCTION DISPUTE RESOLUTION PROCESS: A CROSS-CASE ANALYSIS

(LADR-729; In Press)

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Disputes in construction projects are a common phenomenon around the world. The practice of approaching courts to resolve disputes, a risk-seeking behaviour of parties in a dispute, is influenced by several factors. The availability of litigation risk-transfer instruments like litigation insurance (LI) and third-party litigation funding (TPLF) can potentially change the litigious behaviour of disputants. LI and TPLF markets have evolved differently in various jurisdictions around the world. The variance in the maturity levels provides research opportunity to distill and document the learnings pertaining to the growth LI and TPLF in matured regimes and apply them in nascent markets. In this research, the authors consider the German (matured market for LI and TPLF) and Indian (nascent market) jurisdictions to identify potential focus areas influencing the growth of litigation risk-transfer instruments. With reference to TPLF, this study concludes that while the legal framework is no doubt important in creating a favourable climate for adoption, its growth is influenced by agreement-level factors.

TOWARDS BETTER APPLICABILITY OF PUBLIC PROCUREMENT LAW: DELAYCLAIMS BY THE CONTRACTOR AND LIMIT OF COMPENSATION UNDER THE PERFORMANCE GUARANTEE

(LADR-731; In Press)

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Contracts between government and private entities are a daily occurrence. The administrative contracts are concluded by selecting the private partner by the public authority, through the means provided by the law such as tenders, auction and direct negotiation. Such contracts are governed by the national Public Procurement Law of the country. The term of Public Procurement Law relates to those legal provisions and legitimate arrangements that control the purchasing and procuring of works, services, and goods by the government, institutions, and public bodies. These include, amongst others, ministries, public enterprises, municipalities and city councils. It was on October3, 2018, that a new Egyptian public procurement; namely, the law no.

182 of 2018, was issued to regulate contracts concluded by public authorities. The executive regulation of the law was issued on October 31, 2019. This paper presents a set of proposed amendments to the law, in line with relevant laws in many countries of the world, standards forms of contracts and court rules, to make it more equitable and to avoid unbalanced provisions that make international contractors and investors refrain from dealing with major projects in Egypt. The suggested amendments address two specific subjects, "delay claims by the contractor" and the "limit of compensation underperformance guarantee".

IDENTIFICATION OF BIM DIMENSION-SPECIFIC CONTRACT CLAUSES IN EPC TURNKEY PROJECTS

(LADR-732; In The Review Process)

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Construction operations are becoming increasingly complex. This has necessitated a greater need for collaboration. Building Information Modeling (BIM) aids enhanced project visualization and collaboration. When it comes to contractual issues associated with BIM implementation, the extant literature mainly focuses on issues around model ownership, intellectual property and data security. However, there is a lack of focus on the expectations to be set out in a contract according to envisaged BIM uses (dimensions). To address this gap, the study identifies BIM dimension-specific contract provisions (BDSCP) for smooth BIM implementation. To this end, a review of literature followed by qualitative inductive study is undertaken involving twelve international experts from industry and academia to identify BDSCPs. The resultant 28 BDSCPs highlight the focus areas while drafting a contract and can eventually assist stakeholders in realising the benefits of BIM implementation.

RECENT PARTY WALL DISPUTES

(LADR-738; In Press)

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For centuries, party walls have been a common construction practice in many countries. In New York City (NYC) they have been used since the 1700s. The city accounts for about 201,000 "attached" buildings. The historic NYC speculative construction practice had relied heavily on attached row houses built by the same developer; agreements were rarely drafted and the number of party walls or remnants thereof is not sure. The paper examines the issues related to new construction involving existing party walls Insufficient investigations led to redesigns, accidents or delays. Out of concerns of pounding during earthquakes, recent building codes require structures be separated by a gap, involuntarily complicating even alterations along party walls. The longest delays, though, are caused by adjoining owners opposed to the development or intent to maximize

financial gains thru litigation. They resist inspections or any physical attachment to walls, even necessary repairs. The study juxtaposes 15 years of building violations, incidents, construction regulations and legal decisions. It tracks construction accidents that led to building regulations increasingly progressing from empirical to engineered construction safety inspections. At their turn, these prompted a ten-times increase in court petitions based on statutes, but only minor changes in common law. Concerns are raised that some litigations may set aside safety and structural stability issues. Analysis of typical party wall scenarios concludes that in almost all cases development requires licenses to inspect and repair. In their absence architectural and structural solutions need to account for risks posed by legal uncertainties.

DISPUTE RESOLUTION IN THE MINING INDUSTRY: LESSON LEARNED FROM THE EFFECTS OF BLASTING ON NEARBY STRUCTURES

(LADR-739; In Press)

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Blasting is a common practice in surface mining operations to remove waste rock and to excavate mineral deposits. However, blasting creates adverse effects such as blast-induced ground vibrations, air overpressure, dust, fumes and flyrock. Residential communities living closure to a mine site and other structures present in the vicinity of a mining operation will be subject to blast-induced damages. Humans can perceive low level vibrations from blasting events that cause their house to shake. They become concerned about cosmetic or structural damages due to the blast-induced vibrations and air overpressures. Some cosmetic and structural damage claims from the community are legitimate. However, many claims are found to be false during the investigation of citizen complaints. In these instances, monetary compensation is still expected, arguing the damages were solely due to blasting activities in nearby mines. This study presents cases and investigations that occurred to resolve owner filed complaints for regulatory action and monetary compensation. This study addresses the importance of record keeping and monitoring of blast operations and two positive outcomes result: (1) assist regulatory authorities to assess compliance with the blasting regulations and prevention of damage to structures, and (2) help the mining industry identify the critical blasting information needed to protect nearby structures minimize liability claims.

COMPARISON OF MEDIATION SYSTEMS IN THE CONSTRUCTION INDUSTRY OF TWO EUROPEAN COUNTRIES

(LADR-741; In Press)

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The construction process is multistage and usually involves different stakeholders. The stakeholders of this process pursue different goals and implement them by different means, which would predetermine various disputable situations. In case of resolving disputes in the court, it is necessary to prepare and provide a large number of documents and evidence. Those have to be prepared separately to each defendant depending on the type of dispute. Resolving construction disputes by such judicial way takes a substantial period of time and incurs substantial expenses. Large amounts of company resources and time are invested to dispute resolving processes that can be used in a business. Among the various dispute resolution methods, mediation has been increasingly gaining recognition and acceptance in construction. Unfortunately, in new European countries like Lithuania, the implementation of mediation still is on the initial stage. The study encompasses the nature of construction disputes, key features of mediation, analyzed main differences among court and mediation processes, pros and cons of mediation with special reference to the construction industry in Germany and Lithuania. Based on these results, recommendations to increase mediation in new European countries were elaborated. Finally, it was concluded that more education to construction professionals about mediation, more training of competent construction mediation, and incorporation of mediation clauses in construction contracts are strongly advocated.

DRIVER'S COMPLIANCE IN WORK ZONES: TWO-LANE RURAL ROADS -VS.- FREEWAYS

(LADR-743; In Press)

Didier M. Valdes, Carla Lopez del Puerto, Benjamin Colucci, Alberto M. Figueroa, Edgardo Concepción-Carrasco, Lorena Sierra-Betancur, Yindhira Taveras-Canela
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Inadequate signage and pavement markings and drivers' distractions in roadway work zones are contributory high-risk factors for workers and drivers in two-lane rural and multi-lane freeway facilities. The changes imposed by the work zone in the operating conditions or the roadway alignment, including the installation of temporary traffic control (TTC) devices and barriers, lane and shoulder width changes, and the presence of construction equipment, personnel, and materials, increase the driver workload and the risk of high severity crashes. Driving simulation is a useful tool that has been used for the analysis of operational and safety aspects of different geometric scenarios in both rural and urban contexts. A previous driving simulator experiment regarding the impact of an active global positioning system (GPS) while driving along a TTC of a work zone in a high-speed divided highway concluded that smartphone usage increases driver's distractions and has the potential to contribute to severe and fatal crashes. This paper presents the results of a driving simulator study that compared the potential safety implications related to the use of a GPS while driving on two different road geometries and operational situations (two-lane rural road vs. multi-lane divided freeway). Specifically, the effects of the distraction caused by the navigation information provided by an active GPS while approaching or entering the advanced warning area of the TTC and the drivers' compliance with work zone regulations were investigated. The TTC design in the simulations followed the corresponding suggestions presented in typical applications (TAs) of the Manual on Uniform Traffic Control Devices (MUTCD). However, the implementation of TTCs on actual work zone activities in two-lane rural roads does not always follow the MUTCD recommendations. The results indicate that drivers following GPS routing directions in two-lane rural roads are more likely to encroach in the workspace, suggesting that additional or stricter precautions and measures must be implemented in the TTC Plan to mitigate the safety impact of distracted drivers. Supplementary and more stringent legislation is recommended to tackle three main aspects: driving distraction with GPS, encroaching into the workspace, and compliance with safe TTC designs.

APPLICATION OF NATURAL LANGUAGE PROCESSING TO AUTOMATICALLY IDENTIFY EXCULPATORY CLAUSES IN CONSTRUCTION CONTRACTS

(LADR-746; In The Review Process)

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Construction projects, due to their very nature, are capital-intensive and risk-prone. Risk allocation and its management, therefore, is an integral part of construction operations. A reasonably drafted contract allocates risk to a party that is best capable of handling it. Imbalance in risk allocation, however, is a common feature in construction contracts. By including exculpatory clauses, risks are often transferred without assessing a party's capability to handle such risks. This bias in risk allocation promotes the adversarial relationship. Therefore, it is essential to identify the presence of such clauses before signing a contract. While it is possible to identify them by reading the bid documents, the manual process is time-consuming and often not pursued, considering the lack of time in the project bidding stage. Automation of such tasks can therefore aid in a manager's decision-making process. However, it requires tools that can quickly and reliably identify and extract exculpatory clauses. To this end, the study presents a Natural Language Processing (NLP)-based model as a proof of concept to identify the exculpatory clauses automatically. The conceptual model developed demonstrates that NLP is potentially a useful tool, aiding decision-makers to refine their negotiation strategies before signing a contract.

SURVEY OF STATE TRANSPORTATION AGENCIES' DESIGN INFORMATION BEST PRACTICES ON LUMP SUM DESIGN-BUILD PROJECTS DURING PROCUREMENT

(LADR-749; In The Review Process)

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Owners that solicit proposals for lump sum design-build transportation projects must provide a minimum level of design and other pertinent information to prospective design-builders in the procurement stage of the project. Existing research on this topic relies heavily on a "percent complete" designation and demonstrates a lack of industry standard. This research presents a literature survey focused on owner's best practices related to the recommended level of design information provided in Lump Sum Design-Build Request for Proposals. Next, this research examines publicly available information from 22 State Transportation Agencies as well as industry groups to identify owner provided design level at the procurement stage of lump sum design-build projects. Additionally, 17 State Transportation Agencies are further analyzed for additional related information . The main contributions of this study findings include: 86.4% of State Transportation Agencies recommend owners provide prospective design-builders with a 30%+/- or below design level at the procurement stage; 88.2% of State Transportation Agencies analyzed provide environmental studies, geotechnical studies, Right-of-Way information, and existing utilities information. Ultimately the research will help to establish data-supported transportation industry common best practices for the lump sum design-build procurement process and will help to mitigate disputes including applicability of Spearin liability.

Schedule of Presentations and Speakers

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10:15 a.m. – 12:15 p.m. | Technical Session 1: Room D

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Speaker: Tong Zhao, *Delta Consulting Group, Inc.*

LADR-746 APPLICATION OF NATURAL LANGUAGE PROCESSING TO AUTOMATICALLY IDENTIFY EXCULPATORY CLAUSES IN CONSTRUCTION CONTRACTS
Speaker: Venkata Santosh Kumar Delhi, *Indian Institute of Technology Bombay*

LADR-673 ONTOLOGY FOR LINKING DELAY CLAIMS WITH 4D SIMULATION TO ANALYZE EFFECTS-CAUSES AND RESPONSIBILITIES
Speaker: Michel Guevremont, *Concordia University*

LADR-732 IDENTIFICATION OF BIM DIMENSION-SPECIFIC CONTRACT CLAUSES IN EPC TURNKEY PROJECTS
Speaker: Venkata Santosh Kumar Delhi, *Indian Institute of Technology Bombay*

LADR-729 LITIGATION RISK TRANSFER MECHANISMS IN CONSTRUCTION DISPUTE RESOLUTION PROCESS: A CROSS-CASE ANALYSIS
Speaker: Venkata Santosh Kumar Delhi, *Indian Institute of Technology Bombay*

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LADR-731 TOWARDS BETTER APPLICABILITY OF PUBLIC PROCUREMENT LAW: DELAYCLAIMS BY THE CONTRACTOR AND LIMIT OF COMPENSATION UNDER THE PERFORMANCE GUARANTEE
Speaker: Amr Mohammad Abu Helw, *American University in Cairo*

LADR-738 RECENT PARTY WALL DISPUTES
Speaker: Dan Eschenasy, *New York City Buildings Department*

LADR-743 DRIVER'S COMPLIANCE IN WORK ZONES: TWO-LANE RURAL ROADS -VS.- FREEWAYS
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LADR-741 COMPARISON OF MEDIATION SYSTEMS IN THE CONSTRUCTION INDUSTRY OF TWO EUROPEAN COUNTRIES
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LADR-739 DISPUTE RESOLUTION IN THE MINING INDUSTRY: LESSON LEARNED FROM THE EFFECTS OF BLASTING ON NEARBY STRUCTURES
Speaker: Krishna Kisi, *Texas State University*

LADR-749 SURVEY OF STATE TRANSPORTATION AGENCIES' DESIGN INFORMATION BEST PRACTICES ON LUMP SUM DESIGN-BUILD PROJECTS DURING PROCUREMENT
Speaker: Elizabeth Brogan, *University of Colorado Denver*

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