Supplementary Materials

Table S1. Serial numbers explanation from the Figure 6.

Ref No.	Author	Year	Title	Conference	Journal
1	Peter E.D. Lovea,∗, Jingyang Zhoua, Jane Matthewsb, Matthew Lavenderb, Troy Morsec	2018	Managing rail infrastructure for a digital future: Future-proofing of asset information		Transportation Research
2	Kayis MA Abuzayana, Andrew Whytea, Joyce Bella	2014	Asset-management framework(s) for infrastructure facilities in adverse (post-conflict/disaster-zone/high-alert) conditions	Procedia Economics and Finance	
3	Paul Brousab, Paulien Herdera, Marijn Janssena	2015	Towards Modelling Data Infrastructures in the Asset Management Domain	Procedia Computer Science	
4	Paul Brousa, Paulien Herdera, Marijn Janssena	2016	Governing Asset Management Data Infrastructures	Procedia Computer Science	
5	Silvana Bruno, Mariella De Fino, Fabio Fatiguso	2018	Historic Building Information Modelling: performance assessment for diagnosis-aided information modelling and management		Automation in Construction
6	Hasan Burak Cavka, Sheryl Staub-French, Erik A. Poirier	2017	Developing owner information requirements for BIM-enabled project delivery and asset management		Automation in Construction
7	Aaron Costina, Alireza Adibfara, Hanjin Hub, Stuart S. Chenc	2018	Building Information Modeling (BIM) for transportation infrastructure –Literature review, applications, challenges, and recommendations		Automation in Construction
8	Blaine Fanning; Caroline M. Clevenger	2014	Implementing BIM on Infrastructure: Comparison of Two Bridge Construction Projects		Practice Periodical on Structural Design and Construction
9	Eissa Fathallaa, Yasushi Tanakab, Koichi Maekawaa	2018	Remaining fatigue life assessment of in-service road bridge decks based upon artificial neural networks		Engineering Structures
10	Paula Fraga-Lamas *, Tiago M. Fernández-Caramés and Luis Castedo	2017	Towards the Internet of Smart Trains: A Review on Industrial IoT-Connected Railways		Sensors

Ref No.	Author	Year	Title	Conference	Journal
11	Clemente Fuggini a,*, Andrea Manfreda a, Juan Jesús Álvarez Andrés b, Livia Pardi c, Ralph Holst d, Dionysios A Bournas e, Gian Marco Revel f, Paolo Chiariotti f, Jos Llamas g, Giampiero Gatti h, Milan Dvorak i, Giacomo Mariani	2016	Towards a comprehensive asset integrity management (AIM) approach for European infrastructures		Transportation Research Procedia
12	R.V. Hari Ginardia,*, Wawan Gunawanb, Septiawan Rosetya Wardanaa	2017	WebGIS for Asset Management of Land and Building of Madiun City Government	Procedia Computer Science	
13	Isidro Durazo-Cardenas∗, Andrew Starr, Christopher J. Turner1, Ashutosh Tiwari2, Leigh Kirkwood, Maurizio Bevilacqua, Antonios Tsourdos, Essam Shehab, Paul Baguley, Yuchun Xu3, Christos Emmanouilidis	2018	An autonomous system for maintenance scheduling data-rich complex infrastructure: Fusing the railways' condition, planning and cost☆		Transportation Research
14	Abdou Karim Jallowa, Peter Demianb, Chimay J. Anumbac, Andrew N. Baldwinb	2017	An enterprise architecture framework for electronic requirements information management		International Journal of Information Management
15	Joseph M. Giglio, John H. Friar, William F. Crittenden *	2018	Integrating lifecycle asset management in the public sector		Business Horizons
16	Yasanur Kayikci	2018	Sustainability impact of digitization in logistics	Procedia Manufacturing	
17	Florian Kellnera, Andreas Ottoa, Christian Brabändera	2017	Bringing infrastructure into pricing in road freight transportation – A measuring concept based on navigation service data	Transportation Research Procedia	
18	Tuyen Le, H. David Jeong	2016	Interlinking life-cycle data spaces to support decisionmaking in highway asset management		Automation in Construction
19	Janet Leea,∗, Gregory Fisherb	2004	Infrastructure assets disclosure in Australian public sector annual reports		Accounting Forum
20	Pin-Chan Lee, Yiheng Wang, Tzu-Ping Lo∗, Danbing Long	2018	An integrated system framework of building information modelling and geographical information system for utility tunnel maintenance management		Tunnelling and Underground Space Technology

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21	Pekka Levi€akangas, Seong Mok Paik, Sungkon Moon	2017	Keeping up with the pace of digitization: The case of the Australian construction industry		Technology in Society
22	Peter E.D. Love a,⇑, Dominic Ahiaga-Dagbui b, Morten Welde c, James Odeck	2017	Light rail transit cost performance: Opportunities for futureproofing		Transportation Research
23	Peter E.D. Love a,∗, Ian Simpson b, Andrew Hill b, Craig Standing	2013	From justification to evaluation: Building information modeling for asset owners		Automation in Construction
24	Peter E.D. Love a,c, Jingyang Zhou a, Chun-pong Sing a, Jeong Tai Kim b	2013	Documentation errors in instrumentation and electrical systems: Toward productivity improvement using System Information Modeling		Automation in Construction
25	Peter E.D. Love a , ∗, Jingyang Zhou a , Jane Matthews b , Harbin Luo c	2016	Systems information modelling: Enabling digital asset management		Advances in Engineering Software
26	Peter E.D. Love a,⇑, Jingyang Zhou a, David J. Edwards b, Zahir Irani c, Chun-Pong Sing	2017	Off the rails: The cost performance of infrastructure rail projects		Transportation Research
27	Mahmoud R. Halfawy, Dana J. Vanier, and Thomas M. Froese	2006	Standard data models for interoperability of municipal infrastructure asset management systems		Can. J. Civ. Eng.
28	Marco Macchi*, Irene Roda*, Elisa Negri*, Luca Fumagalli*	2018	Exploring the role of Digital Twin for Asset Lifecycle Management	IFAC PapersOnLine	
29	Mária Trojanováa	2014	Asset Management as Integral Part of Road Economy	Procedia Engineering	
30	S. Thomas Ng1; Frank J. Xu2; Yifan Yang3; Hongyang Li4; and Junjie Li5	2018	A Social Networking Enabled Crowdsourcing System for Integrated Infrastructure Asset Management	Construction Research Congress 2018	
31	E.A. Pärn a,∗, D.J. Edwards a, M.C.P. Sing b	2017	The building information modelling trajectory in facilities management: A review		Automation in Construction
32	Sanyapong Petchrompo, Ajith Kumar Parlikad	2019	A review of asset management literature on multi-asset systems		Reliability Engineering and System Safety
33	A. Sánchez-Rodrígueza,∗, B. Riveirob, M. Soilánb, L.M. González-deSantosa	2018	Automated detection and decomposition of railway tunnels from Mobile Laser Scanning Datasets		Automation in Construction
34	Rafael Sacksa, Amir Kedarb, André Borrmannc, Ling Mad,∗, Ioannis	2018	SeeBridge as next generation bridge inspection: Overview, Information		Automation in Construction

Ref No.	Author	Year	Title	Conference	Journal
	Brilakise, Philipp Hüthwohle, Simon Daumc, Uri Kattela, Raz Yosefa, Thomas Liebichf, Burcu Esen Barutcuf, Sergej Muhicf		Delivery Manual and Model View Definition		
35	Bharathwaj Sankarana, Guillermo Nevettb, William J. O'Briena,∗, Paul M. Goodrumb, Joshua Johnsonb	2018	Civil Integrated Management: Empirical study of digital practices in highway project delivery and asset management		Automation in Construction
36	Stefania C. Radopoulou a, Ioannis Brilakis	2016	Improving road asset condition monitoring	Transportation Research Procedia	
37	Jennifer Whyte ∗, Angelos Stasis, Carmel Lindkvist	2016	Managing change in the delivery of complex projects: Configuration management, asset information and 'big data		International Journal of Project Management
38	Yifan Yanga, S. Thomas Nga,∗, Frank J. Xua, Martin Skitmoreb	2018	Towards sustainable and resilient high density cities through better integration of infrastructure networks		Sustainable Cities and Society
39	Panayioti C. Yianni a, Luis C. Neves a, Dovile Rama a, John D. Andrews a,⇑, Robert Dean	2016	Incorporating local environmental factors into railway bridge asset management		Engineering Structures
40	Zeeshan Aziz, Zainab Riaz Muhammad Arslan	2017	Leveraging BIM and Big Data to deliver well maintained highways		Facilities
41	WenjuanZhang a, WenbinWang	2014	Cost modelling in maintenance strategy optimisation for infrastructure assets withlimiteddata		ReliabilityEngineeringandSystemSafety
42	Osama Abudayyeh, P.E., and Hussien T. Al-Battaineh	2003	As-Built Information Model for Bridge Maintenance		Journal of Computing in Civil Engineering
43	Najaf Ali, Stuart S. Chen, Rohit Srikonda, and Hanjin Hu	2014	Development of Concrete Bridge Data Schema for Interoperability		Journal of the Transportation Research Board
44	Julian Amann and André Borrmann	2016	Embedding Procedural Knowledge into Building Information Models: The IFC Procedural Language and Its Application for Flexible Transition Curve Representation		Journal of Computing in Civil Engineering
45	Julian Amann, Dominic Singer, André Borrmann	2015	Extension of the upcoming IFC alignment standard with cross sections for road design	Conference: Proc. of the International Conference on	

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				Civil and Building Engineering Informatics 2015	
46	J. Bein	2011	Modelling of structure geometry in Bridge Management Systems		Archives of civil and mechanical engineering
47	Fernando G. Bañuelos Blanco, Haibo Chen	2014	The Implementation of Building Information Modelling in the United Kingdom by the Transport Industry	Procedia - Social and Behavioral Sciences	
48	A. Borrmann and J. Jubierre	2013	A multi-scale tunnel product model providing coherent geometry and semantics		Computing in Civil Engineering
49	Yang Ji; André Borrmann; Jakob Beetz; and Mathias Obergrießer	2013	Exchange of Parametric Bridge Models Using a Neutral Data Format		Journal of Computing in Civil Engineering
50	A. Borrmann*, T.H. Kolbe, A. Donaubauer, H. Steuer, J.R. Jubierre & M. Flurl	2015	Multi-Scale Geometric-Semantic Modeling of Shield Tunnels for GIS and BIM Applications		Computer-Aided Civil and Infrastructure Engineering
51	Alex Bradley ∗, Haijiang Li, Robert Lark, Simon Dunn	2016	BIM for infrastructure: An overall review and constructor perspective		Automation in Construction
52	Martin Breunig , André Borrmann, Ernst Rank, Stefan Hinz , Thomas Kolbe , Matthäus Schilcher , Ralf-Peter Mundani, Javier Ramos Jubierre, Matthias Flurl, Andreas Thomsen, Andreas Donaubauer , Yang Ji c, Steffen Urbanb, Simon Laun a, Simon Vilgertshofer d, Bruno Willenborg e, athias Menninghaus a, Horst Steuer e, Sven Wursthornb, Jens Leitloffb, Mulhim Al-Doorif, Nima Mazroobsemnani	2017	Collaborative multi-scale 3d city and infrastructure modeling and simulation	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	
53	Heng Li a, Neo K.Y. Chan a, Ting Huang a, Martin Skitmore b,∗, Jay Yang b	2012	Virtual prototyping for planning bridge construction		Automation in Construction
54	S. DiBernardo	2012	Integrated Modeling Systems for Bridge Asset Management – Case Study	Structures Congress	
55	L.Y. Ding, Y. Zhou ∗, H.B. Luo, X.G. Wu	2012	Using nD technology to develop an integrated construction management system for		Automation in Construction

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			city rail transit construction		
56	Ge Gao1, Yu-Shen Liu2,*, Jia-Xing Wu3, Ming Gu4, Xu-Kun Yang5, and Hua-Liang Li 6	2016	IFC Railway: A Semantic and Geometric Modeling Approach for Railways based on IFC	International Conference on Computing in Civil and Building Engineering	
57	Burcin Becerik-Gerber, A.M.ASCE1; Farrokh Jazizadeh2; Nan Li3; and Gulben Calis4	2012	Application Areas and Data Requirements for BIM-Enabled Facilities Management		Journal of construction engineering and management
58	Amin Hammad, Cheng Zhang & Yongxin Hu & Elaheh Mozaffari	2006	Mobile Model-Based Bridge Lifecycle Management System		Computer-Aided Civil and Infrastructure Engineering
59	Shih-Fang Huang; Chun-Sung Chen; and Ren-Jye Dzeng	2011	Design of Track Alignment Using Building Information Modeling		Journal of transportation engineering
60	Seongwoon Jeong a , ∗, Rui Hou b , Jerome P. Lynch c , Hoon Sohn c , Kincho H. Law	2007	An information modeling framework for bridge monitoring		Advances in Engineering Software
61	Yang Ji, André Borrmann and Mathias Obergrießer	2011	Towards the Exchange of Parametric Bridge Models using a Neutral Data Format		Computing in Civil Engineering
62	Javier Ramos Jubierre, André Borrmann	2015	Knowledge-based engineering for infrastructure Facilities: assisted design of railway tunnels based On logic models and advanced procedural geometry Dependencies		Journal of Information Technology in Construction
63	S. Gokhan Karaman, Stuart S. Chen, and Benny J. Ratnagaran	2013	Three-Dimensional Parametric Data Exchange for Curved Steel Bridges		Transportation Research Record:
64	Hyunjoo Kim1; Kevin Orr2; Zhenhua Shen3; Hyounseok Moon4; Kibum Ju5; and Wonsik Choi6	2014	Highway Alignment Construction Comparison Using Object-Oriented 3D Visualization Modeling		J. Constr. Eng. Manage
65	M. M. Marzouk; and M. Hisham	2014	Bridge Information Modeling in Sustainable Bridge Management	International Conference on Sustainable Design and Construction (ICSDC) 2011	
66	Christian Kocha, Andre Vonthron, Markus König	2017	A tunnel information modelling framework to support management, simulations and visualisations in mechanised tunnelling projects		Automation in Construction

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67	Naoki Kodama, Ray Fujita	2017	Study of standard of LOD/LOI toward implementing CIM in Japan	Proceedings of the 3rd International Conference on Civil and Building Engineering Informatics in conjunction with 2017 Conference on Computer Applications in Civil and Hydraulic Engineering	
68	Sahar Kurwi1, Peter Demian and Tarek M. Hassan	2017	Integrating BIM and GIS in railway projects: A critical review	Association of Researchers in Construction Management Conference	
69	S.H. Lee, B.G. Kim	2011	IFC Extension for Road Structures and Digital Modeling	Procedia Engineering	
70	S.-H. Lee, S. Park, J. Park, and K.W. Seo	2014	Open BIM-based Information Modeling of Railway Bridges and its Application Concept	Computing in civil and building engineering at ACSE 2014	
71	Xiaojun Li, Xiaodong Lin, Hehua Zhu, Xiuzhi Wang and Zhaoming Liu'	2016	A BIM/ GIS-based management and analysis system for shield tunnel in operation	Proceedings of International Conference on Computing in Civil and Building Engineering	
72	Katherine A. Liapi	2003	4D Visualization of Highway Construction Projects	Proceedings of the Seventh International Conference on Information Visualization	
73	Nizar Markiz ⇑, Ahmad Jrade	2014	Integrating a fuzzy-logic decision support system with bridge information modelling and cost estimation at conceptual design stage of concrete box-girder bridges		International Journal of Sustainable Built Environment
74	Mohamed Marzouk, Mohamed Hisham, Sabri Ismail, Mohamed Youssef	2010	On the use of building information modeling in infrastructure bridges	27th International Conference-Applications of IT in the AEC Industry	
75	Mohamed MARZOUK and Ahmed ABDEL ATY	2012	Maintaining Subways Infrastructures using BIM	Construction Research Congress 2012	
76	Mohamed Marzouk and Mohamed Hisham	2014	Implementing Earned Value Management using		KSCE Journal of Civil Engineering

Ref No.	Author	Year	Title	Conference	Journal
			Bridge Information Modeling		
77	Petr Matějka	2016	The importance of a transport infrastructure construction for the implementation of BIM	International Scientific Conference People, Buildings and Environment 2014	
78	Mohammed Mawlana, Faridaddin Vahdatikhaki, Ahmad Doriani, Amin Hammad	2015	Integrating 4D modeling and discrete event simulation for phasing evaluation of elevated urban highway reconstruction projects		Automation in Construction
79	Alcı´nia Zita Sampaio	2003	Geometric modeling of box girder deck for integrated bridge graphical system		Automation in Construction
80	Adriana X. Sanchez1*, Judy A. Kraatz2, Keith D. Hampson1, and Sudharsanan Loganathan3	2014	BIM for Sustainable Whole-of-life Transport Infrastructure Asset Management	Proceedings of Sustainability in Public Works Conference	
81	Bharathwaj Sankaran 1, Jojo France-Mensah 2 and William J. O'Brien3	2016	Data Integration Challenges for CIM in Large Infrastructure: A Case Study of Dallas Horseshoe Project	International Conference on Computing in Civil and Building Engineering (ICCCBE 2016)	
82	Nader M. Okasha, Dan M. Frangopol ∗	2011	Computational platform for the integrated life-cycle management of highway bridges		Engineering Structures
83	CS Shim1a, NR Yun2, HH Song3	2011	Application of 3D Bridge Information Modeling to Design and Construction of Bridges	The Twelfth East Asia-Pacific Conference on Structural Engineering and Construction	
84	ARUN M. SHIROLÉ, STUART S. CHEN & JAY A. PUCKETT	2008	Bridge Information Modeling for the Life Cycle Progress and Challenges	Transportation Research Circular E-C128: International Bridge and Structure Management Conference	
85	Yutaka Sugita1, Tatsuya Kawaguchi2, Koichiro Hatanaka3, Hiroshi Shimbo4, Masato Yamamura5, Yuichi	2016	Development of a design support system for geological disposal using a CIM concept	International Conference on Computing in Civil and Building Engineering	
86	Yu-Chi Sung1, Chun-Chung Chen2*, Kuo-Chun Chang3	2016	Extended Bridge Inspection Module of a Life-cycle Based Bridge Management System	International Conference on Computing in Civil and Building Engineering	

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87	Fumiki Tanaka1, Masato Hori2, Masahiko Onosato3, Hiroaki Date4, and Satoshi Kanai5	2016	Bridge Information Model Based on IFC Standards and Web Content Providing System for Supporting an Inspection Process	International Conference on Computing in Civil and Building Engineering	
88	Liam R. Tawelian1, Slobodan B. Mickovski1	2016	The Implementation of Geotechnical Data Into the BIM Process	Procedia Engineering	
89	Simon Vilgertshofer, André Borrmann	2017	Using graph rewriting methods for the semi-automatic generation of parametric infrastructure models		Advanced Engineering Informatics
90	Jiang Xu	2017	Research on Application of BIM 5D Technology in Central Grand Project	Procedia Engineering	
91	Nobuyoshi Yabuki, Takashi Aruga, Hiroshi Furuya	2013	Development and application of a product model for shield tunnels	ISARC	
92	Nobuyoshi Yabuki	2016	Current status of civil construction information modeling initiative and projects in Japan	Civil Engineering Conference in the Asian Region	
93	Josef Zak1 and Helen Macadam2	2017	Utilization of building information modeling in infrastructure's design and construction	IOP Conf. Series: Materials Science and Engineering	
94	Yang Zouand Shuixing Zhou	2014	A Model-based BIM Framework for Bridge Engineering		Applied Mechanics and Materials
95	Christopher James Roberts, Erika Anneli Pärn, David John Edwards, Clinton Aigbavboa	2018	Digitalising asset management: concomitant benefits and persistent challenges		International Journal of Building Pathology and Adaptation
96	Love, Peter ED, and Jane Matthews	2019	The 'how' of benefits management for digital technology: From engineering to asset management		Automation in Construction
97	Belmont, Dan, Kevin Hade, and Kojo Sefah	2020	Digital Asset Performance Management—Taking Utility Asset Management to the Next Level		Climate and Energy
98	Munir, Mustapha, Arto Kiviniemi, and Stephen W. Jones	2020	Business value of integrated BIM-based asset management		Engineering, Construction and Architectural Managemen
99	Salem, O., Samuel, I. J., & He, S	2020	BIM and VR/AR technologies:from project development to lifecycle asset management	Proceedings of International Structural Engineering and Construction Holistic Overview of Structural Design and Construction	

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100	Huang, J., Gheorghe, A., Handley, H., Pazos, P., Pinto, A., Kovacic, S., Collins, A., Keating, C., Sousa-Poza, A., Rabadi, G. and Unal, R	2020	Towards Digital Engineering -- The Advent of Digital Systems Engineering		Int. J. System of Systems Engineering
101	Lu, Qiuchen, Xiang Xie, Ajith Kumar Parlikad, Jennifer Mary Schooling, and Eirini Konstantinou	2020	Moving from building information models to digital twins for operation and maintenance	Proceedings of Institution of Civil Engineers-Smart Infrastructure and Construction	