

Waleed Ahmed Khan P.E

Lecturer of Civil Engineering

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WORK EXPERIENCE

Lecturer of Civil Engineering (2016 – Current)

NED University of Engineering & Technology, Karachi, Sindh

Courses

Construction Engineering, Quantity and Cost Estimation, Construction Jobsite Management, Engineering Surveying-II, Construction Contracts & Systems in Building Construction

Research Projects

1. Development and Assessment of Virtual Reality Application for Construction Worksite Safety-**Ministry of Science & Technology Funded (2024-onwards)**
2. Digitization of the bridges' inspection process for the bridges on **CPEC** route using Disruptive technologies like LiDAR, IoT, UAV, AI and VR. - **CPEC-CRG funded Project by HEC (2021-2024)**
 - Drone-Survey for Urban Bridges: UAV based data collection of Samama Bridge, Drig Road bridge and Jam Sadiq bridge.
 - LiDAR-Survey for Urban Bridges: Performed Laser scanning of Samama Bridge, Drig Road bridge and Jam Sadiq bridge using Leica BLK 360 LiDAR
 - Point Cloud Registration for Urban Bridges: Point Cloud Models of Samama Bridge, Drig Road bridge and Jam Sadiq bridge were developed using Leica Cyclone Register 360
 - 3D-Reconstruction of Urban Bridges: Developed 3D reconstructed models of Samama Bridge, Drig Road bridge and Jam Sadiq bridge using Reality Capture software through data collected from UAV and LiDAR.
 - Urban Infrastructure Planning: Integrated Infracore-QGIS to develop simulations of infrastructure using developed 3D reconstructed models of bridges.
 - Urban Infrastructure's Group immersiveness: Developed Infrastructure visualization in Projection VR system for group immersiveness using VIZARD's interface.
 - Point cloud statistical Analysis for quality assessment
 - Image processing for detection and measurement of concrete cracks.
 - Deep learning for generating predictive visualization of surface cracks
 - Digitized Inspection of Infrastructure: Inspection of urban bridges were performed in immersive environment of VR using Federal Highway Administration (FHWA), American Association of State highway and Transportation Officials (AASHTO) and National Highway Authority (NHA) inspection standards
3. Development of guidelines for Energy Efficient Housing in Pakistan. **HEC-NRPU funded Project (2019-2023)**
4. Public Mass transport Bus terminal **INTERNATIONAL PROJECT- United States MASS DOT (2018-2019)**
 - BIM Geo-referencing: Integrated Geo-Referenced Drone imagery with BIM model of Metro Bus station.
 - BIM-VR Integration: Developed interacted visualization of BIM model using Enscape and Revit.

CONSULTANCY & TRAINING SERVICES

- Provided services of Point Cloud Modelling and As-Built Development of *Herat Cement Factory* which is situated in Afghanistan using UAV and AgiMeta Shape Pro. to a surveying consultancy firm, FIELD EXPERT. (2024)
- Performed Topographic survey using UAV to the site of *Kennup K4* to a surveying consultancy firm, FIELD EXPERT. (2023).
- Provided Building Information Modelling training to 250 Engineers in a national initiative program of PEC (Pakistan Engineering Council) as a trainer at Department of Civil Engineering NED University (2023-2024).

EDUCATION

05/05/2020 – Onwards Karachi, Pakistan

DOCTOR OF PHILOSOPHY IN CIVIL ENGINEERING (VIRTUAL DESIGN & CONSTRUCTION)

NED University of Engineering & Technology

30/06/2015 – 24/05/2018 Karachi, Pakistan

MASTERS OF ENGINEERING AND MANAGEMENT (CONSTRUCTION) WITH DISSERTATION

NED University of Engineering & Technology

31/12/2010 – 30/12/2014 Karachi, Pakistan

BACHELOR OF CIVIL ENGINEERING NED University of Engineering & Technology

RESEARCH PUBLICATIONS

Peer-Reviewed Journal Publications

- **Khan, W.A.**, Arif, F. Technology integrated framework for condition digitization of urban RCC bridge. J Civil Struct Health Monit (2025). <https://doi.org/10.1007/s13349-025-01029-2> (**SCIE-Q1-Journal**)
- **Khan, W.A.**, Arif F., “Automated Inspection and Data Management of RCC Bridges through LiDAR, Virtual Reality, and Bridge Information Modeling”. Iranian Journal of Science and Technology, Transactions of Civil Engineering (**SCIE-Q2-Journal**) (Under Review-2025).
- **Khan, W.A.**, Arif F., Khan, A.U.R. & Asad, B.R, “CrackGAN: Generative Adversarial Networks based Predictive Visualization mechanism of Crack Propagation in RC Bridge Elements”. Advances in Structural Engineering. (**SCIE-Q1-Journal**) (Under Review-2025)
- Arif, F., **Khan, W.A.**, Mixed Reality-Information Modeling Integrated Workflow and Application for Building Construction Progress Monitoring”. Sustainable and Resilient Infrastructure (Under Review-2025). (**ESCI-Q2-Journal**)
- Arif, F., Azhar, N., & **Khan, W. A.** (2024). Energy audit based identification of energy efficiency improvement opportunities for existing houses. Mehran University Research Journal of Engineering and Technology, 43(4), 1-13. (**ESCI-Publication**)
- Arif, F., **Khan, W.A.** Smart Progress Monitoring Framework for Building Construction Elements Using Videography–MATLAB– BIM Integration. Int J Civ Eng (2021). doi.org/10.1007/s40999-021-00601-3 (**SCIE-Q2-Publication**)
- Arif, F., **Khan, W.A.** A Real-Time Productivity Tracking Framework Using Survey-Cloud-BIM Integration. Arab J Sci Eng (2020). doi.org/10.1007/s13369-020-04844-5 (**SCIE-Q1-Publication**)

Peer-Reviewed Conference Publications

- Arif F., **Khan W.A.** (2023). “LiDAR-UAV integrated Digitization of Civil Infrastructure for Visualization of Physical Condition”. Technology Enabled Civil Infrastructure Engineering & Management Conference (TECH-IEM) “Sustainable infrastructure and digital connectivity”

- Arif, F., Taha Jawed M. & **Khan, W.A** (2022). “Operational Energy Life Cycle Assessment of residential houses – Analytical study of a district of Karachi.” 4th Conference on Sustainability in Civil Engineering (CSCE’22) Department of Civil Engineering Capital University of Science and Technology, Islamabad Pakistan.
- Arif F., **Khan W.A.**, and Zehra S.B. (2017). “Assessment of ICT Use Awareness and Bottlenecks in Adoption in the Construction Organizations of Pakistan.” International Conference on Sustainable Development in Civil Engineering (ICSDC 2017).
- Arif F., **Khan W.A.** (2016) “Use of Building Information Modeling for improving & controlling construction labor productivity”. Proceedings of 8th International Civil Engineering Congress (ICEC-2016) “Ensuring Technological advancement through innovation based knowledge Corridor”

DIGITAL SKILLS

Naviswork, Synchro 4D, Revit, Enscape for Revit, ISO 19650, Autodesk ReCAP, Cloud Compare (3D point cloud processing), Cyclone Register 360, Agisoft metashape, QGIS, Primavera P6, C#, Python, Vizard (WorldViz Virtual Reality), Unity 3D Engine & Reality Capture

RESEARCH INTEREST

Virtual Design & Construction, Automation in Construction, Energy Efficient Buildings, Virtual Reality applications in construction, Data Science in Project Control., Smart Infrastructure, Sustainable Construction and Infrastructure Health Monitoring

LANGUAGES

Mother tongue(s): **URDU**

Other language(s): **ENGLISH**

PROFESSIONAL AFFILIATIONS

25/11/2021 – CURRENT

Professional Engineer-Pakistan Engineering Council (PEC)

11/06/2021 – CURRENT

Member of Institution of Engineers Pakistan (IEP)

02/12/2024 – CURRENT

Unity 3D Certified Professional