Fundamental and Innovative Surveying Techniques in Brisbane's 2032 Olympic Infrastructure Construction - Kangaroo Point Bridge: Improving Livability and Excellence in Sustainability

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SUMMARY

The Kangaroo Point Bridge (KPB) represents a transformative milestone in Brisbane's infrastructure, aligning with the city's preparations for the 2032 Olympics. This 460-meter-long pedestrian bridge, supported by a 95-meter-tall mast and 32 suspension cables, not only enhances community connectivity but also exemplifies how collaboration, innovation, and resilience can address the challenges of modern sustainable infrastructure development. From its inception in late 2021 to completion in Dec 2024, the project adopted an innovative construction approach. Essential structural elements, including foundations, the bridge mast, and the bridge deck spans, were predominately prefabricated at various local and international steel manufactures. These components underwent further assembly at the Port of Brisbane before being transported 22km up the river to be installed on-site in real time, ensuring minimal disruption to river traffic and optimising construction logistics. The objective of our work was to ensure the precise and timely delivery of all surveying tasks, including the setup of control networks, field surveys, and data processing, to meet the technical requirements of this complex project. Key results include the successful implementation of a robust survey control network spanning the 320-meter Brisbane River, precision alignment of prefabricated structural elements during real-time installation, and the creation of detailed 3D documentation using laser scanning and BIM technologies for compliance and future maintenance. Collaboration played a crucial role, with three senior surveyors contributing over 8,000 hours to the project, working closely with clients to align deliverables with their requirements and construction schedules. Resilience was demonstrated by overcoming challenges such as the Brisbane River flooding in February 2022, which necessitated adaptive strategies to maintain accuracy and timing under tight deadlines. Our innovative approach included measuring the angled ends of the cylindrical cable stay housings to compute the future center-to-center distances of the suspension cable lengths, allowing the precise implementation of the cable stressing routine. This novel technique minimized errors and optimized construction

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efficiency. □□This paper introduces the methodologies, results, and lessons learned from our involvement in the KPB project. It concludes that a combination of advanced surveying techniques, digital tools, and effective teamwork is essential for managing complex infrastructure projects. The significance of our work lies in its contribution to advancing sustainable and digital infrastructure, positioning Brisbane as a leader in Olympic-ready urban development and setting a benchmark for future infrastructure projects worldwide.□□