



## Frequently Asked Questions

### Design and Details

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*What is your **maximum span**?* The maximum span currently offered is 12.1m. Longer spans of up to 18m are in development, and if your project requires these spans, please get in touch with us.

*Is the bridge a **concrete bridge** or a **composite bridge**?* The bridge is made of steel reinforced concrete, and the 100 year design life is achieved by using 40 MPa concrete. It does not use composite material, nor is it fibre reinforced.

*How **heavy** are the components?* Without concrete, a typical 12.1m span, 2.44m-wide panel is 4.2–5t. The standard abutment for a single lane bridge weighs ~1.2t, and the standard wing walls are ~0.5t each.

*Are there any **traffic volume limits** on the bridge?* As the bridge deck is designed to AS5100 standards, and the deck is one homogeneous slab with no deck joints, there are no traffic volume limits other than as defined by the bridge width (which has variable AADT according to state standards).

*What **certification** do you give?* The bridge designs are certified by SMEC to AS5100 standards, and this documentation can be provided upon request. We certify the standard deck and abutments, with the global bridge design and foundation design completed and certified by others.

*What **details** are provided if I am designing a bridge with the InQuik system?* Standard technical details will be provided, as well as basic CAD style drawings for the bridge components, to allow them to be incorporated into your bridge designs.

*If the bridge is in a **corrosive environment**, what formwork material do you use? Isn't this going to be too expensive?* For a highly corrosive environment, we recommend the use of marine grade stainless steel form, as well as ZAM<sup>®</sup>-coated steel if desired. Depending on the requirement, the formwork will protect the concrete from corrosion for the life of the form, potentially extending the bridge life by up to 3 times. The additional cost of the formwork material upgrade is generally minimal compared to the cost of the bridge project.

*Does the system comply with **AS5100**?* The system has been designed and certified by SMEC to comply with the Australian Standards – Bridge Design AS5100 requirements, including the SM1600 loading.

*Can I have a **custom bridge** if it is outside of your standard designs?* We can modify the designs to accommodate job-specific requirements, such as variable abutment and wing wall heights, and skew. Anti-buoyancy vents can also be incorporated into the deck panels. Get in touch with the specifications, and if we can do it, we will work with you to provide custom components.

*Do I need **steel certification** for onsite reinforcement work?* No, steel certification is not necessary. All the reinforcing steel is certified by the Australian Reinforcing Company (ARC), and only minor work is necessary on-site, provided the installation is done as per the suggested installation method.

*What is the **connection detail** between the panels?* Steel reinforcing tie bars are used to connect the panels. These typically have a 400mm lap over the panel reinforcing cage, and are 1000mm long.

*Can the **deck be integrated** into the abutment and/or approach slab?* Yes. As the deck and abutment parts are filled with concrete on-site, provision can be made to integrate them together to form a solid mass of concrete. This would create a stronger, more robust structure, and eliminate the need for bearing strips and tie-down bolts, thus also reducing the long-term inspections and maintenance necessary for the bridge.

## Transport & Delivery

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*What is the typical **lead time** from order to delivery?* After the bridge designs are finalised and the supply agreement is in place, standard componentry can be provided ex-factory in up to 5 weeks, and bespoke projects would typically take 6–8 weeks.

*Where is the **system made**?* Our current fabrication facilities are based in the Newcastle area at the ARC factory, with the ability to be fabricated at a number of locations around Australia. We use Australian reinforcing and other materials wherever possible.

*How many components can be transported on one truck?* A typical single lane, single span bridge can be transported on two trucks, which includes 2 deck panels, 4 wing walls and 2 abutments, with appropriate connection pieces. It is possible to transport 4 standard deck panels stacked on each other, on one truck.

## Installation

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*Does it require any **propping**?* The abutments and bridge deck are fully self-supporting, and should not require any external props at any point in the construction process. However, the abutments and wing walls should be checked to ensure they are level to the base, and braced if required. Long wing walls may need to be braced to prevent splaying or deflection.

*How do you **install the abutments with wing walls**? Do they come as one part or 3 parts?* The abutments and wing walls come as 3 separate components, and are assembled on-site with tie bars placed between the parts, and cover plates over the joint. They are filled with concrete in one continuous pour.

*Do you need to do any **post tensioning or transverse stressing**?* The reinforcing cage in the panels is designed to be fully structural on its own, without the need for any post-tensioning or transverse stressing.

*When filling the abutment with concrete, **how high can you pour in one go**?* The maximum height that can be poured in one go is 1.5m when the formwork is 2.5mm thick, and 2.4m with formwork that is 3.0mm thick. If this height is exceeded, it will need to be poured in stages to allow the concrete to partially set and remove the fluidity of the concrete so that the hydrostatic pressure is alleviated. The subsequent layers of fresh concrete must be placed as soon as practical to enable a fully compacted and monolithic element, and to avoid dry joints between the pour sections.

*What type of crane is required to install the InQuik parts?* As the InQuik components are much lighter than precast analogues, they can be installed using a truck-mounted crane or HIAB, with the necessary load capacity. As a guide, a standard 12.0m deck panel (no kerb) weighs ~4.5t, and a

preassembled single lane abutment/wing wall set might weigh ~2.0t (depending on the specific design).

*After the concrete is poured, how long until it can take traffic?* Both the abutment and the deck are designed to use 40 MPa concrete. Once this has reached 30 MPa, it can take up to 150 vehicles per day (no load restriction). The time to reach this state depends on site conditions and weather, but is typically around 7 days. The concrete reaches 40 MPa typically after 28 days, after which the full design load can be used.

*If we cannot get 40 MPa concrete and we have to use 25 MPa concrete, what effect does this have?* 40 MPa concrete is required to fulfil the 100 year design life criteria. If a lesser grade of concrete is used, this will affect the durability, and thus the life expectancy of the bridge. Check local requirements.

*How long does the abutment need to cure before the deck can be placed?* The empty deck (without concrete) can be placed on the abutment 24 hours after the concrete has been poured. However, the deck cannot be filled with concrete until the compressive strength of the abutment has reached 20 MPa, which typically occurs after 3–4 days when using 40 MPa concrete. Note that the deck should not be placed and left without concrete if there is any risk of flooding.

*How long does it take to install the InQuik parts?* The time to install depends on how many people are working on-site, the complexity of the bridge design, and the speed and preferences of the installer. For example, it is possible to install the abutments and wing walls and pour and finish the concrete in one day, but an installer may prefer to place the parts on one day, and then pour the concrete on another day. Typically, with a small crew of 3–5 people, two preassembled abutment/wing wall sets could be installed and the concrete poured and finished in about 6 hours on-site. The installation of the decks and tie-bars for a single span would take between 2–4 hours to install the deck parts, then another 2–3 hours to fill with concrete if it is completed in a single continuous pour.

*How do I tie down the deck to the abutments?* Each deck panel has provision for 3 tie-down points on both ends, which are rated at 10 kN each. We can provide tie-down bolts if required.

*Would personnel with concrete experience be able to build it without having built a bridge before?* Yes. We are working with several councils across NSW which are utilising their own staff to install bridges. The system is very simple, requiring no specialised skills other than concreting.

*How do I know how to install the InQuik bridge? Do you provide installation support?* We provide detailed installation guides upon request, and we can assist with installation supervision and training if required.

## Long-term and maintenance

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*How do you inspect the bridge, when you cannot see the concrete because of the form?* The only way to properly inspect any bridge for internal cracking is by using ground-penetrating radar. A visual inspection is not sufficient.

*What are the effects of the galvanised steel leaching into the environment?* The zinc layer reacts with the atmosphere to produce a passive surface coating which protects the underlying metal. Over time this coating can rub off as zinc oxide and zinc carbonate, which are both insoluble in water, and thus unable to be absorbed by living organisms and of inherently low toxicity. Zinc is also an essential element for life, and under normal circumstances is only toxic when dissolved in water in high concentrations.

*Can you **strip the formwork** if you want?* The formwork for the deck can be stripped if desired, however there is no advantage to removing the formwork, and it additionally acts as an impermeable barrier, giving added protection to the concrete from external corrosive influences.

*How easy is the bridge to **clean** (eg: graffiti)?* The steel formwork makes it easy to clean the bridge using standard solvents, as the smooth steel is not absorbant. Note that certain chemicals may react with the steel coating (eg: Zinc or ZAM), so care should be taken to avoid staining the surface.