Queensland Bridge Competition – Teacher PD Housekeeping notes

- This webinar will start at 3.30 pm out of respect for everyone's time.
- Please ensure your **camera and audio are switched off** this is to ensure the presenters do not have any disruptions.
- If you have issues with the audio or visual of the presentation, please log out and log back into the session
- Q&A will be live throughout the session, please submit your questions via the Chat.
- Audio and video will be made active at the end of the presentation for you to ask questions, if you wish.
- A copy of the slides will be made available to all attendees post webinar.
- This webinar will be recorded so if you don't want to be recorded (audio or video), please leave your audio and video off.

ENGINEERS AUSTRALIA













Forging Links between Schools and Industry



2025 Queensland Bridge Competition Teacher Information Webinar



Government

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Acknowledgement of Country





The Engineering Link Group, The Queensland Government and Engineers Australia acknowledge the Turrbal, Yugara and Gubbi Gubbi people, as the First Nations owners of the lands where we meet today. We pay respect to their Elders, lores, customs and creation spirits. We recognise that these lands have always been places of teaching, research and learning.

The Engineering Link Group acknowledges the important role Aboriginal and Torres Strait Islander people play within the engineering community.

What is The Engineering Link Group (TELG)?

- Supporting and encouraging students to consider engineering as a career since 1994 (starting with two schools in Townsville)
- Supporting teachers by providing experiences that deepen their understanding and application of maths and science through engineering
- Active in Queensland and New South Wales

Who am I?



- I am a teacher of over 30 years' experience, teaching all levels of Mathematics, Science and Physics in State and Catholic schools in Queensland
- Currently Curriculum Leader Mathematics at a P-12 school in Burpengary.
- Formerly spent 15 years as HOD Mathematics at Townsville SHS), and then CL – Science and Maths here at my current school
- Formed The Engineering Link Group with Paul Richards in 1994



- TELG has operated the competition since 2014
- Over 3700 students and over 120 different schools across Queensland have participated
- Sponsors of this event:





- Mike Whitehead Engineer The Department of Transport and Main Roads
- "The Physics and Engineering of Bridges (and some tips about building a bridge out of spaghetti!)"
- Greg Millican TELG
 - Hints and tips building a successful bridge
 - About the Competition in 2025
 - Shameless Plug!
 - Questions



Mike Whitehead

BEng(Civil) GradCertBus CPEng RPEQ APEC Engineer IntPE(Aus)

Director (Systems & Governance) Structures

Engineering & Technology Branch

Department of Transport and Main Roads



Briefly about the Competition?





The Queensland Bridge Competition is a problem-solving, engineering challenge for students from Grades 5 to 12.



Teams of up to 4 students design and build a bridge from store-bought spaghetti and glue.



Teams test their bridge's strength on a custom-made rig.



The bridge that supports the largest peak load before failing is declared the winner.





The competition is open now and runs until 1st September.

- The bridge must span at least 37cm and be no longer than 50 cm.
- The deck must be a minimum of 3 cm wide
- The bridge can hang below the top of the rig but cannot touch the sides of the rig at any point during the test
- The total mass of the bridge (including the load hook) must be no more than 300.0g









The load hook weighs approximately 67g

The ring must be orientated to face under the bridge, as the load cell is attached from below.











Any brand of spaghetti is permitted, as long as it called "Spaghetti"

#4 or #5 spaghetti is okay.

Choice of Glues



- PVA
 - Slow drying
 - Strong bond
 - Fill voids
- Hot Glue
 - Fast drying
 - Weak bond
 - Fill voids

Superglue

- Fast setting
- Strong bond-low shea
- No voids









Glues such as 2-pack epoxy glue and "liquid nails" are not allowed



- Consider designs (look at past bridges)
- Experiment with different glues
- Design before you build
- Build the bridge in sections and then combine the sections
- Make sure the load hook is centred and the bridge is balanced

Is it necessary to build a prototype?



If you have the time...

- It certainly helps
- Can try different structures

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- Test different glues
- Test spaghetti choices
- <u>http://bridgecontest.org/resources/download</u>
- <u>http://ivanmarkov.com/truss-simulator.html</u>
- <u>http://jeramypaxton.com/2013/05/project-rc-kite-initial-testing/</u>

Things to consider when building your bridge



 Spaghetti shrinks when dried.

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- Don't let it dry unevenly
- Use spaghetti from same packet where possible
 - Store the yet-to-be-used the spaghetti with the bridge
- Atmospheric conditions make a difference

Troubleshooting





- Ensure feet of bridge are outside the 35 cm, and are rigid and level
- The load hook needs to be in the centre of the bridge (as much as possible)
- Don't use too much glue
 (bridges can be disqualified if the amount of glue used is considered "excessive")

This type of spaghetti is not allowed!



Load cell and apparatus weighs approximately 0.6 kg









Example







64.04 kg







17.84 kg

Previous Results



Year	Max Load
2024	17.84 kg
2023	64.04 kg
2022	86.18 kg
2021	63.3 kg
2020	76.7 kg
2019	59.8 kg









- The Lakes College (North Lakes) June 3
- CQU Townsville Aug 5
- QUT Gardens Point, Brisbane Aug 11
- Heights College, Rockhampton Aug 25
- Marsden SHS, Logan Aug 29
- St Eugene College, Burpengary Sept 1

Teams can post their bridge to us for testing



- Places determined by largest peak load
- First Place: \$700
- Second Place: \$400
- Third Place: \$300
- Location Winner: \$100* per location (up to 6 locations/regions)

All teams are strongly encouraged to read the Terms and Conditions carefully



- Registered schools can access resources developed by TELG and schools who have successfully competed in the past
- TELG YouTube channel tests from previous years. Students can analyse the bridges and learn from past "mistakes"
- If you would like an engineer mentor, we may be able to organise it – contact us



https://www.telg.com.au/qldcompetition/

2025



The Queensland Bridge Competition is back for 2025!

We are pleased to provide a number of different locations around Queensland, so teams can come together and test their designs on our testing rig. Can anyone beat the record of 86.6 kg (2022)?

The main testing day will be in Brisbane City (QUT Gardens Point) and the testing will be live-streamed where possible and recorded where it can't. We also provide alternative testing options – teams can courier their bridge to us and we'll record the test for you. You can then watch the recording at any time.



Some words of wisdom from the 2024 winners







Engineering Link Project

Year 10, 11 and 12 students

Queensland Tour

- Townsville Friday 26 Sept
- Mackay Monday 29 Sept
- Rockhampton Wednesday 1 Oct
- Bundaberg Thursday 2 Oct

Details coming soon!







Please unmute yourself and ask away!



Thank you to Mike Whitehead (TMR) and Hinu Komene (EA).

Thank you to you for giving up your time.

Best of luck in the competition.

