

Appendix 1. Survey Questionnaire



Please spend a few minutes reviewing the roundwood design concepts and then complete the survey below. The concepts are grouped into 4 categories – small, medium and large buildings and infrastructure.

In completing the survey, please assume that any issues associated with termites, durability or structural design or adequacy have already been addressed.

Name*

Profession*

Company Name*

Title*

Ph Number

Email

Q1 Your overall impression of the designs and concepts was:*

Liked

Disliked

Neutral

Do you have any comments about your first overall impression of all the designs and concepts?

Q2 For each of the design concepts, please rank their general appeal with (1) highly

appealing (2) appealing (3)
neutral (4) un-appealing (5)
forget it

Small i.e shelters

1
 2
 3
 4
 5

Medium i.e remote housing

1
 2
 3
 4
 5

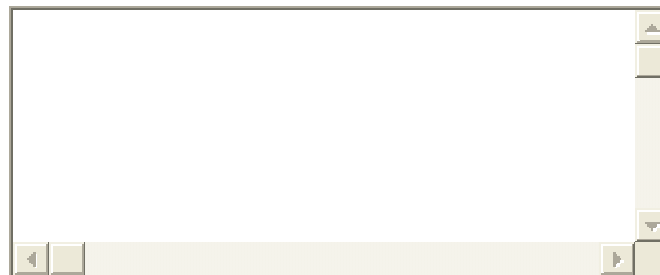
Large i.e industrial buildings

1
 2
 3
 4
 5

Infrastructure i.e sound barrier
or wind break

1
 2
 3
 4
 5

Do you have any comments
about the general appeal of
each concept?



Q3 For each of the design
concepts, please rank their
potential for market
uptake/commercialisation (1)
high (2) medium (3) neutral (4)
low (5) very low

Small i.e shelters

1
 2
 3
 4
 5

Medium i.e remote housing

1

- 2
- 3
- 4
- 5

Large i.e industrial buildings

- 1
- 2
- 3
- 4
- 5

Infrastructure i.e sound barrier or wind break

- 1
- 2
- 3
- 4
- 5

Do you have any comments about the potential for market uptake/commercialisation of each design concept?

Q4 For the designs/concepts that you most favour, do you consider that it is justified or warranted to undertake more detailed R&D towards commercial realisation?*

- Fully support
- Support
- Neutral
- Don't support

Do you have any comments about detailed R&D for the designs/concepts?

Q5 For the designs/concepts that you most favour, what do you consider to be the biggest constraints or impediments to commercial realisation? Please list.

Q6 For your organisation, could you please provide an estimate of the potential market size and spend for the types of buildings/structures

covered by these concepts.

Small i.e shelters (\$) p.a.

Small i.e shelters (m2) p.a. of building

Medium i.e remote housing (\$) pa

Medium i.e remote housing (m2) p.a. of building

Large i.e industrial buildings (\$) pa

Large i.e industrial buildings (m2) p.a. of building

Infrastructure i.e sound barrier or wind break (\$) pa

Infrastructure i.e sound barrier or wind break (lin.m) p.a. of structure

Q7 Please provide any other comments, thoughts or suggestions regarding the above any other potential new uses/applications for small diameter round plantation hardwoods.

Appendix 2. Survey Comments

Do you have any comments about your first overall impression of all the designs and concepts?

- Looked like uni projects from architecture students.
- Intricate connection details required. Strength of materials?
- New and outside the square.
- Interesting, good ideas.
- Some appear to be more practical/feasible than others.
- Resembles traditional indigenous forms of architecture i.e. Pacific Islands.
- Lots of potential for creativity.
- Nice to see a different application of material, especially an under-utilised resource, for good design outcome.
- Great animal shade structures, portable and natural.
- The concept will allow for new and exciting designs shapes with a softer aesthetic appeal.
- This is an innovative use of what was once a waste product of the timber plantation industry. The designs however do not show this level of innovation.
- Free form is exciting.
- Very different concept. Good way to utilise smaller timber.
- Unique and creative was my first impression, however, for our purposes we would want to use the materials to make our own designed park shelters.
- I was pleasantly surprised how appealing I found all of them - much better than I would have expected from such a low valued resource.
- Structural design software would be helpful.
- Very good, but most concepts seem to focus on similar curves. There could be a bit more shape variety.
- Structures are light and airy. Purlin fixings on rounds are often clumsy. Will the steamed timber retain its shape?
- I was most interested as to who would take this on as a commercial concept through to marketing, manufacture and erection.
- Good.
- May be suitable as shade structures.
- Quite innovative.
- Impressive! Maybe also be suitable for YURTS-GERS (Mongolian); OZ-Camp (portability easy assembly) subject to anchoring to the ground.
- It sounds like an excellent idea to me with many possible uses.
- AMAZING!!!! PLEASE SEND ME MORE INFO!!!!
- Touchy Feel-y Timber Structures do not seem appropriate in public areas (vandalism, graffiti, arson, old CCA phobias etc., maintenance, weathering) Sad! But true.
- Quite good however I would like to see more innovative solutions and uses with timber...the infrastructure screen seems like a good idea and much more interesting than the solid concrete precast panels you see today...safety is probably another issue...
- Very Innovative. However only one concept addressed the challenging issue of timber connection details.
- Designs were nice looking but not much basic data provided to be able to utilise products in other ways as well.
- I am very interested in the potential of the plantation hardwood rounds. Specifically for use in small structures and play equipment in parks.
- Great flowing shapes.
- Innovative design always attracts attention. Selling the green concept with eye catching designs has to be a winner.

- I believe we need some variety in design particularly for the average home block. Everything seems to be on straight lines. What is available now is very unattractive. I like what I see but this is a limited set. My first thought was cost.
- How do they curve the members and how do they maintain the curvature?
- East Asian in form and shape, very attractive.
- Most of the structures seemed to have very uniform logs, reality is the form is generally poor. Interested to know if there will be any secondary processing of any of the thinnings.
- First impression was that the product would look natural and different at the same time. I like the idea.
- Questioned how practical they would be to get to market. Also there's an awful lot of rounds and probably not that much call for bus shelters!
- I liked the whole concept from both using more wood in place of non-renewable resources and in creating an alternative market for small diameter logs.
- I could see there being a niche for small public amenity buildings.
- Designs looked good with the use of curved surfaces.
- Curved structures aesthetically suit the resource. Small plantation rounds are not regular shapes so aren't suited to recta-linear designs.
- Great potential use for a difficult to utilise product (excluding biomass).
- Some were more practical than others. Large span sheds and infrastructure wall for highway look promising.
- Curved members tend to suit decorative type structures.
- Similar design footprint - linear - a current limitation? Eg meeting hall with cross plan to suit large area plus ancillary spaces.
- An excellent use of small round timber that otherwise would be thinned to waste.

Do you have any comments about the general appeal of each concept?

- 1. Great for parks/ Landscape, 2. Simple for disaster areas, 3. Maybe not to good around heavy machinery, 4. Great change from looking at flat fences on h/ways.
- The combination of modern and traditional technologies holds the most appeal. I like the simplicity of the designs and the idea of using timber rather than steel to create aesthetically appealing, functional and sustainable building forms.
- The general appeal of each concept is considered to be good. The devil may be in the detail.
- The large span structures are the most innovative use of this product demonstrated in the concepts.
- Thermal rating and insulation would be the drawback.
- Design tools will be the issue, and should be investigated.
- The interaction of the rounds with triangular structural shapes is great.
- New and attractive- not 'Boxy'!
- Interesting statement pieces. I like the look of the sound wall in particular.
- Concepts were generally appealing. Further information about structural properties of the timber would be appreciated.
- Curve and flowing lines so much better than standard boxy architecture so commonly seen, particularly for industrial sheds. I don't like the sound barrier at all.
- I do not like the solid barrier concept of sound and wind barriers, would like to see gaps included that are treed.
- No they look good.
- It is hard to see timber noise barriers making a comeback in the face of concrete and steel.

Do you have any comments about the potential for market uptake/commercialisation of each design concept?

- A kit house developed out of these components could be one commercial solution for more affordable housing and housing those in remote or disaster situations.

- Any system whereby the structure becomes the feature rather than the skin is interesting in commercial terms. Simple and cheap cladding materials may make way for an expression of the structure instead.
- Need to bundle the components into kits for end users.
- I would expect that the industrial shed market might be the hardest to crack. It will come down to cost and how easy is it to design.
- Timber is not a popular structural material in the Queensland construction industry, as it is more time consuming to work with and must be well maintained and treated. Therefore its commercial uptake will be for non-critical structures.
- Climb-ability will be an issue in the public realm. Councils do not like any (minimal) cladding below 2100 high from ground.
- Maybe a recycled plastic or composite cladding would be better than timber.
- Smaller Councils may like the designs ready to use, however, our bushland parks will feature park furniture designs unique to our shire. But I would love to use your materials...give them a trial!
- This will need to be supported by a manufacturer who can follow it through. I would like to see some testing and research on epoxy dowel end connections, as this would ideally lead to innovation in space-frame and truss erection.
- Needs exposure at bdaq and other association meetings.
- Lifespan, maintenance and long term durability would need to be assessed. These would be the first questions a client would ask and to have technical data to support this is very useful.
- Clients are always after innovative products.
- The aesthetic aspect of these structures will be a major selling point. Trying to market these types of structures to clients who do not place high importance on aesthetics will be very difficult.
- More details needed to properly assess commercial opportunity.
- Can the industrial buildings be totally enclosed, otherwise this may limit applicability to keep weather, pests out etc.
- Promote the green credentials/plantation sourced/carbon storage.
- Just the one comment as above I see the best market, biggest market is for the small shelters particularly for the small block. It is where I would start.
- Pre-fabrication of components will assist in success. A building in a box approach.
- This will clearly be the hardest part.
- I suspect the small shelters would have potential because they are not far removed from existing concepts. Similarly with sound/wind barriers there seems to be a desire to give them a natural look.
- Likely to be a niche market. Will require careful marketing. Sustainability a positive factor. Need to make sure structures are durable and will last for at least 20 years.
- Not sure about the commercial uptake of remote housing or the size of its potential market, but they are likely to be responsive to greener options.
- 'Infrastructure' is more a political thing and could be either '1' or '5' depending on what politicians decide.
- Will depend on cost and where they have to come from. I assume you are thinking totally prefab / kit form which would be the go. The killer for me being in WA would be the transport unless you are thinking of setting up factories over here.
- scale of use relevant for loss of vertical space up to 2.0m off Floor level, due to incline, so potential adaptability to integrate a base or plinth, or extend armature longer at lower section

Do you have any comments about detailed R&D for the designs/concepts?

- I think all concepts could be explored, and perhaps a design comp for the small projects with the winning schemes being built would be very helpful to get it market tested and taken up
- Investigate or develop locally produced tensile cladding technologies to complement these timber structures.

- Constructability and easy of erection on site.
- Need to consider durability in white ant country.
- R&D must be carried out for cyclone areas/locations. Connections must be simple to design and put together in the field. Flexibility must be built in.
- Consult more closely with influential potential specifiers and users of target structure types prior to finalising the R&D plan for technical/engineering/architectural aspects.
- Jointing- Refer existing manufacturers, world seems to run on milled sections.
- Possibly a return to the old tenon, mill the end at node points and use existing jointing systems.
- R&D will be necessary to develop a simple connection details.
- Why not just do it. Is R&D required? If the product complies with design / building codes then use it. If it does not then R&D is needed to find design structural/ longevity properties.
- Review what is currently available in terms of low cost kit homes and small structures and try to develop cost comparative, yet more beautifully resolved options.
- modular housing and framing options explored more, such as 'e-habitat' type framing perhaps
- Try to get a couple of these structures into prominent public locations.
- Steam bending and then holding that shape is critical.
- Think you need a bigger range of designs to investigate.
- Would need to be sure that timber has appropriate durability. Not sure that we have the technology to deliver timber treatment without serious splitting etc?
- Have you considered the work done in the CRC for Wood Innovations using microwaves to aid in wood bending?
- Need to consider cost side across the entire supply chain as well market research to determine level of demand for this type of product.
- Concerned about the degradation of timber. Is it treated in some way to prevent chewing insects and rot and at what age are thinnings suitable?
- From a structural point of view I can see connections as a tricky issue that would need investigating - especially as no piece is geometrically alike.
- Fixing to the round to be complementary with existing v fast proprietary systems: adaptability to additional live loading from usage.
- Need to consider a wide selection of species as properties of each are likely to be different.

For the designs/concepts that you most favour, what do you consider to be the biggest constraints or impediments to commercial realisation? Please list.

- Design limits, does every structure look the same?
- Changing attitudes to building with wood especially for large structures.
- Comparison of longevity and durability/degradation against other materials.
- connection details and design strength.
- Not convince industrial areas would be strong enough.
- Will depend on the cost.
- Durability/lifespan compared to steel and concrete structures.
- Could be perceived as primitive.
- Assembly.
- replacement of components.
- Cost, complexity of construction methods and longevity of the materials.
- Cost.
- Ease of construction and \mobility, can the structure be moved many times "
- Cost.
- Support, Training, Availability of Supply, Finish.
- Market acceptance. People tend to stick to what they know and it's a 'new' idea.
- Changing perceptions re the geometry and building materials needed for construction.
- Weather proofness, thermal insulation, sound insulation.

- Keeping exposed members looking good. Cost of joining round members has tended to be expensive requiring proprietary connectors.
- Again, finding the right manufacturer.
- Just getting the knowledge of the product out there.
- Financial viability, life of product limitation particularly if sapwood is left on.
- Maintenance, clients question ongoing maintenance with timber products.
- Jointing- Refer existing manufacturers, world seems to run on milled sections.
- Educating builders as to the benefits of using these materials over conventional timber framing systems.
- Concern about weathering and durability, Concern about termite resistance.
- Budgetary issues and conservatism.
- Fire damage, climbing damage from a landscape architecture perspective.
- Finishing/protective coating is significant. Something that will show the beauty of the wood and perform well. Alkyd oil based finish.
- Cost, ease of construction, lasting components.
- Durability and economics and getting the balance between the two right. For example connections need to be efficient cheap and buildable, pre-fabrication of these elements would help.
- Fitting into existing suburbs with similar building forms, the council planners may not like them
- 1) Log form, 2) Suitable feedstock and availability, 3) moisture content – splitting.
- Approval through respective councils.
- The biggest constraint as I see it is acceptance by regulatory bodies and customers and perhaps even the public to a lesser extent.
- Costs associated with harvesting, delivery (small piece size) and processing (high energy requirement, non-uniform shapes).
- Negative stigma around the strength and durability of wood versus steel and concrete.
- Anything new in the building industry has a hard time, but if there is an exception to that, it is with small, decorative 'architectural' type structures.
- Authority and market acceptance: even after all scientific hurdles (and I see many of those) have been overcome
- Cost and I guess getting people to think differently about design and form. Everyone loves poxy project homes which are not at all responsive to the environment or the setting (sense of place).
- Flexibility to suit building / project programme, for Post Occ Eval to demonstrate uses described or proposed.
- Specific training for fabrication on site anywhere necessary, with benefit of speed, to suit community volunteers.
- Current resource availability but this project may promote further planting.

Please provide any other comments, thoughts or suggestions regarding the above any other potential new uses/applications for small diameter round plantation hardwoods.

- Would be good if typical fixing details etc, were available.
- Good idea! I am interested in how this material can have high end specifically detailed interfaces and junctions. Option 4 just starts to touch on the possibility of high tech design with low tech materials. I can see a use for rural and natural areas shelters and general infrastructure, promoting the use of low embodied energy solutions for the community, but in an "arty" manner.
- Our organisation is unlikely to spend directly on the structures but it is likely to support the concept for animal owners in feedlots and intensive situations where they offer a mobile solution to shelter for horses, sheep, pigs and cattle. I would suggest that this product would just about have an endless potential. The potential will be curtailed by cost.

- Interesting work. Longevity issues will need to be addressed to use timber externally for other applications. Appropriate construction detailing may overcome this.
- As it is not shown any solution to the drawbacks or the design data, I can not design or recommend it for any other use than a garden tent. Generally for an architectural structure and for ease and uniformity of construction tolerances you would need to turn the posts (shaved)
- Can they be used as columns?
- Many questions: treatment / durability / stability / [green or dry?] / proposed steam bending - curvature & compression design issues - particularly with tapered column design / lengths / diameter available / why limit concepts? Make the product as a replacement for existing main structural components / issues of radial vs tangential shrinkage and ensuing drying cracking / sleeve coating options? / dry and plastic impregnation options / issues with Timber Users and Marketing Act in Qld and the equivalent in NSW. having already built over 5,000m³ of structures using plantation roundwood in NSW and knowing this would be illegal in Qld I think the regulatory barriers are the most difficult to overcome. The market will buy if the product is consistently available at known prices and with a reliable [on time and to quality] supply. The buyers will not select the product if it is not cheaper and / or suffers from "quota" shortages imposed by regulation. Regulation will also be needed to allow use as noise barriers but the market for this is enormous and growing. Look at Richter Spielgeraete for potential to develop timber for custom play equipment. www.spielgeraete-richter.de/.
- Not very exciting, but inexpensive bollards might be a good use if the timber strength is there. It is great to see a product use being investigated. A creosote-free preservative treatment may assist with weathering.
- Rain shelter in national parks.
- Build a few and demonstrate them at DesignBuild or similar event. We would be happy to use this product when it is available.
- Not really clear what Q6 is asking for bus shelters and shade structures in public parks and sporting grounds, market them to sporting clubs and associations.
- Great idea for finding some innovative options for timber rounds. My major question would be the availability of the resource. Most of the small diameter timber is from pulpwood plantations and is committed to this purpose.
- Survey a very good idea. Good to keep people informed of progress through this forum.
- Cut into shingles or small wooden tiles to replace CO₂ hungry clay tiles and corrugated tin. Alternately pulp and reconstitute with natural resins into moulded roofing tiles.
- Might be good for beach front projects where steel always rusts.
- Great idea, lots of hurdles, but good on you for giving it a crack. Hope it takes off..
- Form of project unsuited to the residential commercial work predominantly undertaken here, making the application of the system more of a rarer system to incorporate, and more likely in less urban sites.