RIBA

Pylon Design Competition – Response to Questions

Q1. With regards to the Landscape.jpg image and to assist in generating the presentation images, can you confirm the location of where the photo was taken? (Lat/Lon coordinates or British National Grid coordinates)?

A1. The photo was selected purely to enable the Jury Panel to compare all designs in a like for like landscape and the location bears no importance.

Q2. With regards to the Landscape.jpg image and to assist in generating the presentation images, in what direction was the picture taken?

A2. See Answer to Q1.

Q3. With regards to the Landscape.jpg image and to assist in generating the presentation images, what field of view?

A3. See Answer to Q1.

Q4. With regards to the Landscape.jpg image and to assist in generating the presentation images, please confirm that it is a perspective projection?

A4. See Answer to Q1.

Q5. What configurations are available to us when positioning the cables on a tower. In figures 1 and 2 for the typical suspension/tension tower clearance layout it specifies the exact positions but the only constraint specified in the technical requirement is that "The minimum conductor separation between phases of the same or different circuits shall be 8.0m.". Is it possible to vary the positions of the cables?

An example of a horizontal layout meeting the technical requirement can be seen at http://upload.wikimedia.org/wikipedia/en/c/c3/Fort_Puntales_tower_site_taken_from_the_City_of_Cadiz.JPG

A5. 8m is the minimum required separation between conductors positioned at the same level. It is ok to vary the position of conductors but clashing needs to be avoided when conductors are subject to motion or swing.

Q6. http://www.channel4.com/news/design-competition-launched-for-pylon-makeover says that Pylons 'cannot be supported with guy-ropes'. Where can I see this condition at http://www.ribapylondesign.com/ ? Please clarify?

A6. Please refer to Pylon Brief document, section 3.2 'Scope of work'.

Q7. You require entries to involve significant carbon/financial/hassle overhead just so that you can view all entries on A1 boards. To require this at stage 1 is imposing a major and uneccessary obstacle, which effectively filters out a lot of non- corporate entries. Please comment.

A7. A single A1 board is required for stage one submissions. The shortlisted stage one boards will be used in an exhibition at the V&A so we require all competitors to follow the required format.

Q8. Please clarify that the brief is for ' 6 sets of wires (conductors) that need to be a minimum o1imuapartn anw 31mua wnlarst strducuar.e (rehung fb)5(o)5mt thestrdrreby(isu

A8. The spatial design of the structure needs to comply with the clearances shown in figures 1&2 and the system requirements outlined in section 3.3 of 'Design Brief' document.

Q9. What does the dimension of 1.8m shown on figure 1 refer to?
A9. 1.8m is the minimum phase to earth clearance required when the suspension insulator is swung at 35 degrees to the vertical.

Q10. What is Earth Wire Shielding and what angle needs to be 35 degrees? Please clarify the 35 degrees angles on Figure 1 and 2.
A10. The earthwire shielding angle is required to protect phase conductors from lightening strikes. 35 degrees is used for vertical phase configuration and 45 degrees for horizontal/flat formation.

Q11. Will the existing pylons be replaced by the new design or is this only for new installations.
A11. The competition is to find a design that could potentially be used for future pylons, not to replace existing ones.

Q12. What is the planned installation timescale for new pylons form planning routing, approvals and installation?
A12. The process of system design, route planning, environmental assessment, public consultation and obtaining consent can take several years depending on the complexity of the project.

Q13. Is there any preferred method of construction and installation required?
A13. No fixed conception of method of construction but entrants should take account of the need for speed and accuracy particularly in rural settings.

Q14. GENERAL DESIGN – Phases configuration is shown vertical on 3 levels and symmetric. Can we propose a different configuration?
A14. Yes

Q15. GENERAL DESIGN – Acc to cl 3.2 Guyed structures are excluded. Can we propose 2 legs-structures with guys (or equivalent) only between the 2 legs?
A15. Guys are to be avoided due to their susceptibility to damage by farm machinery.

Q16. ACCESS – What is the functional specification for the climbing access to the pylon top and conductors and earth wire?
A16. Traditional access to lattice towers is provided via steel step bolts along the structure legs. Design of the new pylon needs to take into consideration access to structure and conductors/insulators using any safe and practical method.

Q17. GEOMETRY – What is the height (vertical dimension) of the jumper loop shown on figure 2 "Typical tension tower clearance diagram"?
A17. 4.3m

Q18. CALCULATION-LOADING TREES – Case 5b Broken wire conditions: do we have to consider one broken conductor + one broken earth wire simultaneously or in different load cases?

A18. Broken wire condition is only to be used in case 5b, with two broken wires simultaneously at any one time. For guidance purposes, one case could be: the earthwire and the top left phase conductors are broken with all the other five attachment points intact (non broken). Another case could be: the top two phase conductors are broken with the earthwire and the remaining four phase conductors intact (non broken) etc…

Q19. Are the clearance requirements the same if steel isn't used as a design material? E.g. Fibre Reinforced Polymers which are used for wind turbines. If there are different clearance requirements what are these?

A19. The clearances shown are minimum values and apply to all materials. Structures are climbed by people carrying metallic parts and tools.

Q20. Do you have an existing design available to view/download in structural drawings with element sections?

A20. Typical drawing is provided for reference purposes. http://www.ribapylondesign.com/_literature_42005/Typical_Tower_Outline_Design

Q21. Is there a limiting plan area on the ground for the pylon?

A21. An optimum structure design is sought. Unnecessary land take is to be avoided.

Q22. Are there any clearance requirements for the tension tower on figure 2 or are these similar/the same as the suspension tower?

A22. Clearances are similar.

Q23. Is there any restriction as to how many people can form a team? We are looking to have 3 people in one team which will have one submission. Please advise if this is acceptable.

A23. No restriction. However all authors should be credited and acknowledged and be party to the signed declaration form.

Q24. It is stated that environmental loadings should be taken into consideration. Will we be required to submit calculations at any time for loadings and moments? Being a RIBA competition we believe focus will be placed on the design and creativity while taking into 'consideration' the loadings. Can you advise if this is correct? Or is the project more focused on the engineering aspect, in which case will it be advisable that an engineer forms part of the team?

A24. There is no obligation to include an engineer at this stage, however stage 1 entries should be structurally feasible and this will form part of the assessment. Whilst we do not envisage the need for calculations in stage 2, engineering input will almost certainly be required and entrants should make sure that should they be selected, they will have the necessary team members to move forward.

Q25. We do not have any data concerning typical soil conditions and geotechnical environment (neither in the competition brief, nor in the tower design specification). Shall we consider that the foundations of the structure are an issue that will be developed in a further stage and that design shall focus on superstructure?

A25. Stage 1 submissions are to focus on structure design only.

Q26. We do not have any data concerning topography. The analysis of the load cases given in the tower design specification let one assume that the structure will stand on a flat land. Then, vertical deviation of the wires are no to be considered?

A26. Flat topography is to be assumed for the purpose of structure design but height adjustments need to be considered for sloping ground.

Q27. Shall the structure withstand both the efforts for suspension tower and angle tower, or is it allowed to design two different structures for these two different cases?

A27. The loading trees for suspension tower are not to be used for the design of tension tower and vice versa.

Q28. We do not have any data concerning the budget commonly allocated to this type of structure. Can we have an idea of it? Shall the proposals include an estimation of building, maintenance, … costs?

A28. Although cost of the structure, its construction and maintenance are to be taken into consideration in the design, creativity and efficiency of the proposal are of greater importance.

Q29. In the competition brief 1.3, flooding and lightning strikes risks are mentioned. Where can we have specific rules and recommendations on these problems?

A29. Protection against lightning is covered in the answer to question 10 above. Flooding issues are not required for stage 1 submissions.

Q30. In the tower design specifications: own weight of the wires are implied in the load cases (ex: case 5b: no wind, security load -> cable own-weight is 50 kN at each cross arm when it is not broken), is this correct and coherent with a 360m span ?

A31. Yes. The vertical load on the structure takes into consideration the resultant of conductor tensions when the tower is located on top of a hill. This is converted into a weight span that is larger than the standard flat topography span.

Q31. Wind loads on the pylon: in the competition brief 3.5 Design parameters: hourly wind speed is 25m/s ; in the tower design specification hourly wind speed is 35 m/s for case 1a and 30 m/s for case 3, what is the proper value?
Ice load: Shall we consider that the whole surface of the pylon is covered with a 65mm ice layer (no wind) and 15mm ice layer (with wind) or is it only relevant for the wires?

A31. 25 m/s is at sea level. 35 and 30 m/s are already converted to take into account the effect of altitude (250m above mean sea level).

Q32. I refer you to section 3.6 of the competition brief; could you confirm if competitors will be automatically disqualified if their designs do not conform to these dimensions? Can we take the absolute minimum phase to phase clearance to be 3.1m from an electrical perspective instead of 8.0m?

A32. 3.1m is a minimum safety clearance and must be adhered to. For phase/circuit separation clearance, please refer to the answer to question 5.

Q33. In Tower Design Specification, snow loads specification is missing.

A33. These are referred to as ice loads and are included in loading trees 2a and 3.

Q34. In Technical Requirement 3.3, “one single circuit outage while other circuit live” means fully loaded on one side of pylon with zero load on the other side?

A34. This note refers to the electrical load passing through conductors and not mechanical loads on the tower. A single circuit outage on a double circuit tower is defined as one circuit (or side) being live and carrying electrical current while the other circuit is not and earthed.

Q35. In Technical Requirement 3.3, “work on earth wires carried out with single circuit outage” means fully loaded on earth wire with zero load on circuit, vice versa?

A35. Please refer to the answer to question 34 above.

Q36. In Typical Suspension / Tension Tower Clearance Diagram, the dimensions set out are minimum or maximum values? Where dimensions are not specified, are they applicable to insulators above / below?

A36. The clearances shown are minima and apply to all crossarm levels.

Q37. In Typical Suspension Tower Clearance Diagram, what is the angle of deflection at the bottommost insulator for the 3.1m requirement?

A37. This angle is taken as 10 degrees.

Q38. In Typical Tension Tower Clearance Diagram, there is no dimensions for insulator length, conductor sag nor ground clearance. Also there is no setting out for the insulators other than the topmost ones.

A38. The tension insulator set length is 6.25m as shown in section 3.5 of the ‘Pylon Brief’ document. Conductor sag and ground clearance are similar to those for the suspension tower. Setting out is the same for all phase levels.

Q39. Have loads given for tension tower accounted for maximum angular change in load direction already?

A39. Yes

Q40. Are there any limits on the movement of the top of the pylon? If it can sway, how much can it sway?

A40. No limits are required.

Q41. There is a 3.1m distance between points where the cables are attached to the pylon. Must this distance be vertical or can it be in any direction?

A41. This clearance is required in any direction.

Q42. Is the distance (width) between the points where the cables are attached 8m minimum?

A42. yes.

Q43. How long must the pylon last? What is the life expectancy of the current pylon?

A43. 80 years is the minimum required life for pylons.

Q44. What is happening to the current pylons?

A44. The competition is to find a design that could potentially be used for future pylons, not to replace existing ones.

Q45. Is there a budget (per pylon) that we should work to?
A45. No. But an optimum design is sought.

Q46. Can alternative materials to steel be used for the poles or towers?
A46. Yes, but need to comply with the requirements outlined in the documents making part of this competition

Q47. Are there budget cost limits for the pylons?
A47. Please refer to the answer to question 45 above.

Q48. Are the loading values provided in Appendix 2 are inclusive of all safety coefficients?
A48. Please refer to the notes in the 'Environmental Loadings' document. Material strength factors are to be applied to the loads listed on the loading trees. The loadings shown on the loading trees are derived using probabilistic methods and include partial load factors. For design of structures, a material strength factor Gamma m depending on the material used for the structure shall also be applied to the loading trees to obtain the ultimate design loads. For information, Gamma m is taken as 1.15 for steel structures"

Q49. What are the safety factors to be applied to the structural capacity of the insulators?
A49. Insulator design is not required. For information, the material strength factor to be applied to insulators is 1.6.

Q50. Please provide the maximum working load capacities for approved insulators?
A50. Insulator design is not required. For information, the rated strength of insulators is 300kN (including material strength factor) per string. Suspension insulator sets are composed of one single string and tension insulator sets of three.

Q51. Are traditional insulators obligatory or can alternative proposals be made for these?
A51. Alternative proposals to traditional insulators are acceptable.