

**PINNED ARCH**

**Results**

h = \_\_\_\_\_\_\_\_\_mm

L = \_\_\_\_\_\_\_\_\_mm

**CASE1: Vertical load at C**

a1 = \_\_\_\_\_\_\_\_\_mm

h1 = \_\_\_\_\_\_\_\_\_mm

**Table 1: Loading position at point C.**

|  |  |  |  |
| --- | --- | --- | --- |
| **VERTICAL LOAD, W (N)** | **BALANCE LOAD, H (N)** | **HORIZONTAL THRUST FORCE, H** | |
| **EXPERIMENTAL HORIZONTAL THRUST, H TEST = H (N)** | **THEORETICAL HORIZONTAL THRUST, H THEORY (N)** |
| **2** |  |  |  |
| **4** |  |  |  |
| **6** |  |  |  |
| **8** |  |  |  |
| **10** |  |  |  |
| **12** |  |  |  |

**CASE 2: Vertical load at E**

a1 = \_\_\_\_\_\_\_\_\_mm

h1 = \_\_\_\_\_\_\_\_\_mm

**Table 2: Loading position at point E.**

|  |  |  |  |
| --- | --- | --- | --- |
| **VERTICAL LOAD, W (N)** | **BALANCE LOAD, H (N)** | **HORIZONTAL THRUST FORCE, H** | |
| **EXPERIMENTAL HORIZONTAL THRUST, H TEST = H (N)** | **THEORETICAL HORIZONTAL THRUST, H THEORY (N)** |
| **2** |  |  |  |
| **4** |  |  |  |
| **6** |  |  |  |
| **8** |  |  |  |
| **10** |  |  |  |
| **12** |  |  |  |

**CASE 3: Vertical loads at C and E**

a1 = \_\_\_\_\_\_\_\_\_mm

h1 = \_\_\_\_\_\_\_\_\_mm

**Table 3: Loading position at point C and E.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **VERTICAL LOAD, W (N)** | | **BALANCE LOAD, H (N)** | **HORIZONTAL THRUST FORCE, H** | |
| **C** | **E** | **EXPERIMENTAL HORIZONTAL THRUST, H TEST = H (N)** | **THEORETICAL HORIZONTAL THRUST, H THEORY (N)** |
| **2** | **2** |  |  |  |
| **4** | **4** |  |  |  |
| **6** | **6** |  |  |  |
| **8** | **8** |  |  |  |
| **10** | **10** |  |  |  |
| **12** | **12** |  |  |  |

**Discussion/Analysis**

1. Compare the test results of thrust value that is placed at increasing distances from the support left with the equation as given below:



Where:

H = The horizontal thrust reaction at support B (N)

W = Load (N)

L = Span of the arch (m)

a = Load location distance is measured from the left-hand support (m)

h = The rise of arch (m)



1. Show some calculation examples of theoretical value, H theory, of arch horizontal thrust for different loading location of W.
2. Plot the horizontal thrust, H versus vertical load, W for all the three cases. Briefly, discuss the results.
3. Define the factors that effect the results and consequently what are the necessary preventive measures needed to improve the experimental results.
4. Draw the influence line diagram for H value, when one unit vertical load, W moves from A to B. Give some comments on the results of the influence line.

**Conclusions**

Refer to the objective.

**References**/**Appendices**

1. Text book, reference books from the library or electronic references from the internet.
2. Related photo or plate due to the experiment.