

TESTING OF THE MOST IMPORTANT STRUCTURAL MATERIALS

1- Compression test parallel to grains of 2,7x2,8x10 cm timber specimens

| | The maximum resistant force (ultimate force) measured F_u (N) | ultimate strength f_u (kN/cm ²) |
|------------|---|--|
| test no. 1 | 4600 | 0,608 |
| 2 | 3450 | 0,456 |
| 3 | 3625 | 0,45 |
| 4 | 3210 | 0,424 |

2- Compression test parallel to grains of 2,75x2,75x2,75 cm timber specimens (cubes)

| | The maximum resistant force (ultimate force) measured F_u (N) | ultimate strength f_u (kN/cm ²) |
|------------|---|--|
| test no. 1 | 2900 | 0,608 |
| 2 | 3075 | 0,406 |
| 3 | 3625 | 0,45 |
| 4 | 4600 | 0,424 |

Remark: Due to the effect of buckling, the more slender (10 cm long) member should have failed at lower value of the stress. The reason of this not happening so (the strength values were practically the same) was, that due to elongation of the cubes in direction perpendicular to the applied force, the low tensile strength of timber perpendicular to grains, resulted tension failure and thus the cube separated into several slender columns, which failed then due to buckling.

3- Compression test perpendicular to grains of 2,75x2,75x2,75 cm timber specimens (cubes)

| | The maximum resistant force (ultimate force) measured F_u (N) | ultimate strength f_u (kN/cm ²) |
|--|---|--|
|--|---|--|

| | | |
|------------|-----|-------|
| test no. 1 | 710 | 0,094 |
| 2 | 700 | 0,092 |

Conclusion: The compression strength of timber perpendicular to grains is significantly smaller than in direction parallel to grains.

4 Tension test of $\phi 10$ mm diameter reinforcing steel bar

| | | |
|------------|---|--|
| | The maximum resistant force (ultimate force) measured F_u (N) | ultimate strength f_u (kN/cm ²) |
| test no. 1 | 32400 | 41,3 |

5 Compression test of 6,5x12x25 cm small size solid brick parallel to the 25 cm long side

| | | |
|------------|---|--|
| | The maximum resistant force (ultimate force) measured F_u (N) | ultimate strength f_u (kN/cm ²) |
| test no. 1 | 4570 | 0,057 |

6 Compression test of $\phi 100$ mm diameter 12 cm long concrete cylinder

| | | |
|------------|---|--|
| | The maximum resistant force (ultimate force) measured F_u (N) | ultimate strength f_u (kN/cm ²) |
| test no. 1 | 126000 | 1,665 |

Observe the magnitude and the relationship of the ultimate strength of the tested materials!