MESYS Hertzian Stress Calculation 12-2024

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|---|---|
| File name: | HertzPressure.mHertz |
| Project name: | **Protocol Example** |
| Description: | **Hertzian Contact Stress** |
| Date: | Thursday, 20. February 2025 |

MESYS Shaft and Rolling Bearing Calculation

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# Contact Stress Calculation

## Input data

| | | | |
|---|---|---|---|
| First radius body 1 | $r_{11}$ | 5.0000 | mm |
| Second radius body 1 | $r_{12}$ | 5.0000 | mm |
| First radius body 2 | $r_{21}$ | -5.2000 | mm |
| Second radius body 2 | $r_{22}$ | 100.000 | mm |
| Effective length for cylinders | Leff | 0.0000 | mm |
| Normal force | Fn | 200.000 | N |
| Youngs modulus body 1 | $E_1$ | 210000 | MPa |
| Youngs modulus body 2 | $E_2$ | 210000 | MPa |
| Poisson number body 1 | $\upsilon_1$ | 0.3 | |
| Poisson number body 2 | $\upsilon_2$ | 0.3 | |
| Angle between planes for radii | α | 0.0000 | ° |

## Results

| | | | |
|---|---|---|---|
| Major half axis of contact ellipse | a | 0.8172 | mm |
| Minor half axis of contact ellipse | b | 0.0975 | mm |
| Approach of both bodies | δ | 0.0036 | mm |
| Contact stiffness | R | 84259.6 | N/mm |
| Hertzian stress | pH | 1198.6 | MPa |
| Maximal orthogonal shear stress | τxz | 91.882 | MPa |
| Depth for max. orthogonal shear stress | z(τxz) | 0.0729 | mm |
| Maximal orthogonal shear stress | τyz | 298.606 | MPa |
| Depth for max. orthogonal shear stress | z(τyz) | 0.0482 | mm |
| Maximal shear stress body 1 | $\tau Max_1$ | 378.946 | MPa |
| Maximal octahedral shear stress body 1 | $\tau OctMax_1$ | 324.941 | MPa |
| Depth for max. shear stress body 1 | $z(\tau Max_1)$ | 0.0747 | mm |
| Depth for max. octahedral shear stress body 1 | $z(\tau OctMax_1)$ | 0.0698 | mm |
| Equivalent stress body 1 (Tresca) | $\sigma eTresca_1$ | 757.893 | MPa |
| Equivalent stress body 1 (Mises) | $\sigma eMises_1$ | 689.305 | MPa |
| Maximal shear stress body 2 | $\tau Max_2$ | 378.946 | MPa |
| Maximal octahedral shear stress body 2 | $\tau OctMax_2$ | 324.941 | MPa |
| Depth for max. shear stress body 2 | $z(\tau Max_2)$ | 0.0747 | mm |
| Depth for max. octahedral shear stress body 1 | $z(\tau OctMax_1)$ | 0.0698 | mm |
| Equivalent stress body 2 (Tresca) | $\sigma eTresca_2$ | 757.893 | MPa |
| Equivalent stress body 2 (Mises) | $\sigma eMises_2$ | 689.305 | MPa |

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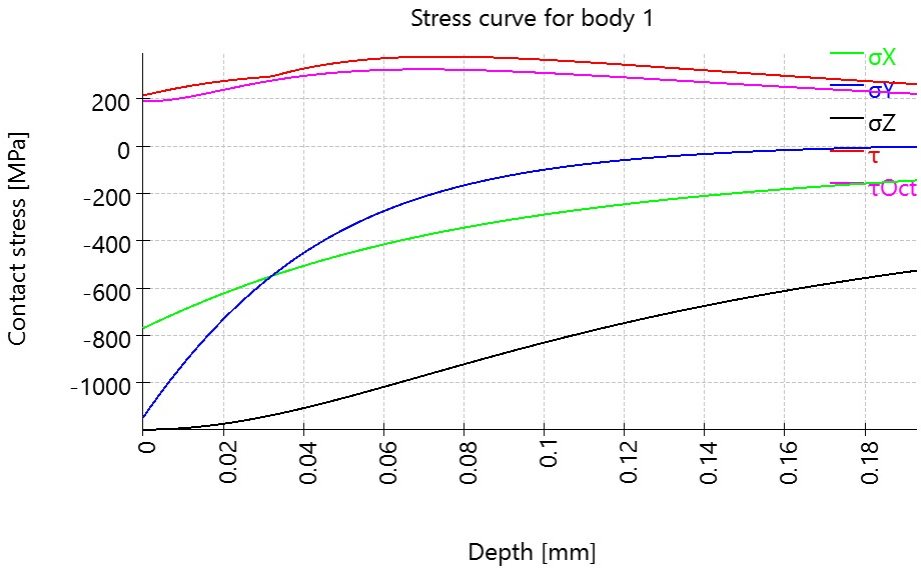


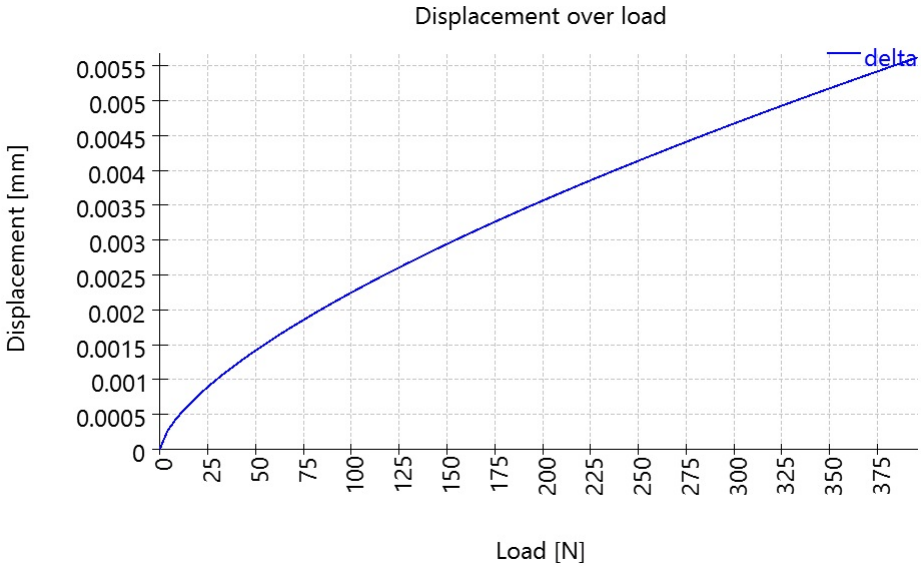


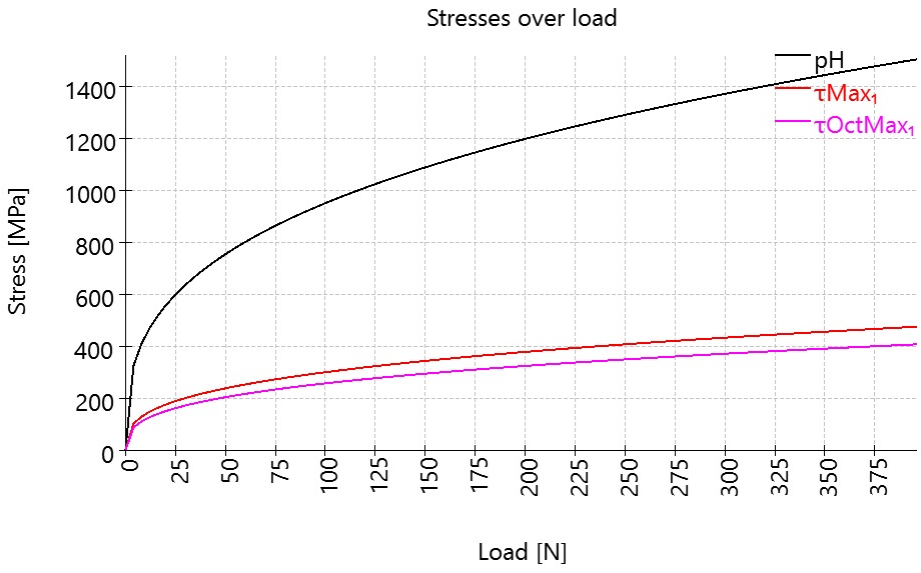

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