Scopus

Documents

Burenin, A.A.[a] , Dats, E.P.[b] , Tkacheva, A.V.[a]
On the modeling of the shrink fit technology
(2014) *Journal of Applied and Industrial Mathematics*, 8 (4), pp. 493-499.

[a] Institute of Machine Science and Metallurgy, ul. Metallurgov 1Komsomolsk-na-Amure, Russian Federation
[b] Vladivostok State University of Economics and Service, ul. Gogolya 39-aVladivostok, Russian Federation

Abstract
A solution is given of a one-dimensional problem of the theory of thermal stresses which simulates the hot shrink fit of a cylindrical clutch on a cylindrical shaft. The distinguished feature in the statement of the problem is taking into account the originating and developing plastic flow of the material of the assembly components due to the nonstationarity of the temperature field and the dependence of the yield material strength on the temperature. It is shown that irreversible deformation may significantly reduce the level of the final residual stresses providing the desired tightness.

Author Keywords
elasticity; plasticity; residual deformations; residual stresses; shrink fit; thermal stresses

Index Keywords
Deformation, Elasticity, Plasticity, Residual stresses, Strength of materials, Thermal stress; Assembly component, Irreversible deformation, Material strength, Non-stationarities, One-dimensional problem, Residual deformation, Shrink fit; Shrinkfitting

References

- Belkin, I.M.
  (1992) *Tolerances and Fits*,
  Mashinostroenie, Moscow:

- Myagkov, V.D.
  (1982) *Tolerances and Fits. Reference Manual, Vol. 1*,
  (ed), Leningrad, Mashinostroenie:

- Gaffarov, R.F., Shchenyatsky, A.V.
  Application of the Finite Element Method for Increasing the Load-Carrying Capacity of Connections Assembled by the Thermal Method
  (2004) *Vysokie Tekhnologii No. 3*, pp. 162-167.

- Shevchenko, Y.N.
  (1970) *Thermoplasticity under Variable Loads*,
  Naukova Dumka, Kiev:

- Makhnenko, V.I., Velikoivanenko, E.A.
  Elastoplastic State in an Unbounded Thin Plate under an Arbitrary Axially Symmetric Heating
  (1966) *Reports of the Scientific Meeting, Vol. 6: Thermal Stresses in the Construction Elements*, pp. 63-70.

- Burenin, A.A., Kovtanyuk, L.V., Panchenko, G.L.
  Modeling of Large Viscoelastic Deformations with Thermophysical Effects Taken into Account
  (2010) *Izv. Ross. Akad. Nauk Mekh. Tverd. Tela No 4*, pp. 107-120.

[Mechanics of Solids 45 (4), 583–594 (2010)]

- Aleksandrov, S.E., Lyalina, E.A., Novozhilova, O.V.
  The Influence of the Temperature Dependence of the Yield Strength on the Stress State in a Thin Hollow Disc
  (2013) *Probl. Mashinostr. i Nadezhn. Mashin No. 3*, pp. 43-48.

- Boly, B., Weiner, J.H.
  (1960) *Theory of Thermal Stresses*,
  Wiley, New York:

- Bykovtsev, G.I., Ivlev, D.D.
  (1998) *Theory of Plasticity*,
  Dalnauka, Vladivostok:

- Ivlev, D.D.
  On the Determination of Displacements in the Elastoplastic Problems of Ideal Plasticity
  (1975) *Achievements of the Deformed Media Mechanics (to the 100th Anniversary of Acad. V. G. Galerkin)*, pp. 236-240.
  Nauka, Moscow:

Correspondence Address
Burenin A.A.; Institute of Machine Science and Metallurgy, ul. Metallurgov 1, Russian Federation