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About

Professor Lin's research expertise is in materials modelling, FEM and metal forming simulations. He has developed a range of physically based material models to simulate microstructure evolution and formability of materials in various metal forming processes for many engineering materials, including aluminium, nickel-based superalloys, titanium, etc.

He has developed Evolutionary Algorithms (EA) theories and software packages to determine unified constitutive equations from experimental data.

Biography

Prior to Birmingham

He worked at the University of Sheffield and UMIST for 4 years as a post-doctoral research associate

Upon leaving the University of Birmingham he returned to Imperial College to take up his current position as Head of Mechanics of Materials Division , Department of Mechanical Engineering.

Postgraduate supervision

PhD thesis Supervised:

- Kar Cheong HO, “Modelling of age-hardening and springback in creep-age forming”, July. 2004, University of Birmingham.
- Chow Cher WANG, “A study into the incremental flow forming of solid cylindrical components, July 2004, University of Birmingham,
- Yunfei LIU, “Characterisation of microstructure and damage evolution in hot deformation”, April 2004, University of Birmingham
- BH Cheong, "Modelling of microstructure and damage evolution in superplastic forming", March 2002, University of Birmingham

Research

Areas of Expertise

- Materials Modeling, FEA, Metal Forming

Research Projects include:

- Modelling of springback in forming high strength car panels
- Evolutionary Algorithms in materials modelling
- Solution heat treatment with cold die forming and quenching
- Modelling of effects of stress-states and strain paths on damage evolution
- From processing to mechanical properties
- Residual stress in forming large section aluminium parts
- Forming of bi-material components

Other activities

Membership of Professional Bodies

- Fellow, Institution of Mechanical Engineers (UK)
- Council Member, Institute of Sheet Metal Engineering (UK)

Publications

Selected / Key publications

- F.P.E. Dunne, J. Lin, D.R. Hayhurst and J. Makin, 2006, Modelling creep, ratchetting and failure in structural components subjected to thermo-mechanical loading, J. of Theoretical and Applied Mechanics, Vol. 44, No. 3, pp667-689
- J. Luo, J. Lin and T A Dean, 2006, A study on the determination of mechanical properties of a power law material by its indentation force-depth curve, Philosophical Magazine, Vol. 86 (19), pp2881-2905.
- J. Lin, K.C. Ho and T.A. Dean, 2006, An integrated process for modelling of precipitation hardening and springback in creep age-forming, Int. J. of Machine Tools & Manufacture, Vol. 46, pp1266-1270.
- P.-P. Jeunechamps, K. C. Ho, J. Lin, J.-P. Ponthot, T.A. Dean, 2006, A closed form technique to predict springback in creep age-forming. Int. J. of Mech. Sci., Vol 48, pp621-629.
- Liu, Y., Lin, J., Dean, T. A. and Farrugia, D. C. J., 2005, A numerical and experimental study of cavitation in a hot tensile axisymmetric testpiece, J. of Strain Analysis, Vol. 40, No. 6, pp571-586. ISSN 009-3247.
- Lin, J., Liu, Y. and Dean, T. A., 2005, A review on damage mechanisms, models and calibration techniques. Int. J. of Damage Mechanics. Vol. 14, pp299-319, ISSN 1056-7895.
- Wong, C.C., Lin, J. and Dean, T.A., 2005. Effects of roller path and geometry on the flow forming of solid cylindrical components. J. of Mat. Proc. Tech., Vol. 167, pp344-353. ISSN 0924-0136.
- Lin, J., Kowalewski, Z.L. and Cao, J., 2005, Creep rupture of copper and aluminium Alloy under combined loadings-- Experiments and their various descriptions, Int. J. of Mech. Sci., Vol. 47, pp1038-1058. ISSN 0020-7403.
- Lin, J. and Dean, T.A., 2005. Modelling of microstructure evolution in hot forming using unified constitutive equations. J. of Mat. Proc. Tech., Vol. 167, pp354-362. ISSN 0924-0136.
- Lin, J., Liu, Y., Farrugia, D.C.J. and Zhou, M., 2005, Development of dislocation based-unified material model for simulating microstructure evolution in multipass hot rolling, Philosophical Magazine A, Vol. 85, No. 18, pp1967-1987. ISSN 1478-6435.
- Garett, R.P, Lin, J and Dean, T.A., 2005, An investigation of the effects of solution heat treatment on mechanical properties for AA 6xxx alloys: experimentation and modelling, Int. J. of Plasticity, Vol. 21, No. 8, pp1640-1657. ISSN 0749-6419.
- Garett, R.P, Lin, J and Dean, T.A., 2005, Solution heat treatment and cold die quenching In forming AA6XXX sheet components: Feasibility study. Advanced Materials Research, Vols 6-8, pp673-680. ISSN: 1022-6680.
- Lan, F., Chen, J., Yu, X. and Lin, J., 2004, Springback simulation and analysis in U-typed sheet metal forming processes, J. of Plasticity Engineering, Vol. 11, No. 5, pp78-84. ISBN 1007-2012.
- Wang, C. C., Dean, T. A. and Lin, J., 2004, Incremental Forming of solid cylindrical components using flow forming principles, J. of Mat. Proc. Tech., Vol 153-154, pp60-66. ISSN 0924-0136.
- Ho, K.C., Lin, J. and Dean, T.A., 2004, Constitutive modelling of primary creep for age forming an aluminium alloy, J. of Mat. Proc. Tech., Vol 153-154, pp122-127. ISSN 0924-0136.
- Lan, F., Chen, J. and Lin, J., 2004, Comparative analysis for but side structures and lightweight optimization, Journal of Automotive Engineering - Part D, (Proceedings of Instn. Engrs.), Vol. 218, pp1067-1075.
- Garett, R., Xu, S., Lin, J and Dean, T.A., 2004, A model of the transformation of the austenite to bainite phase in producing dual phase steels. Int. J. of Machine Tools and Manufacture, Vol 44/7-8, pp 831-837.
- Ho, K.C., Lin, J. and Dean, T.A., 2003, Modelling of springback in creep forming thick aluminium sheets, Int. J. of Plasticity, Vol. 20/4-5, pp733-751.
- Liu, Y. and Lin, J., 2003, Modelling of microstructural evolution in multipass hot rolling, J. of Mat. Proc. Tech., Vol. 143, pp 723-728.
- Wong, C.C., Dean, T.A. and Lin, J., 2003, A review of spinning, shear forming and flow forming processes, Int. J. of Machine Tools & Manufacture, Vol. 43, pp1419-1435.
- Lin, J. and Liu, Y., 2003, A set of unified constitutive equations for modelling microstructural evolution in hot deformation, J. of Mat. Proc. Tech., Vol. 143, pp 281-285.
- Cheong, B. H., Lin, J. and Ball, A. A., 2003, Modelling the effects of grain-size gradients on necking in superplastic forming, J. of Mat. Proc. Tech., Vol. 134 (1),pp. 10-18.
- Lin, J., 2003, Selection of material models for predicting necking in superplastic forming, Int. J. of Plasticity, Vol. 19, No 4, pp469-481.
- Lin, J., Cheong, B.H. and Yao , X., 2002, Universal multi-objective function for optimising superplastic-damage constitutive equations, J. of Mat. Proc. Tech., Vol 125-126, pp199-205.
- Li, B., Lin, J. and Yao, X., 2002, A novel evolutionary algorithm for determining unified creep damage constitutive equations, Int. J. of Mech. Sci., Vol 44, No 5, pp987-1002.
- Lin, J., Dunne, Hayhurst, D. R and F.P.E., 2001, Errors in creep-cyclic plasticity testing: their quantification and correction for obtaining accurate constitutive equations, Int. J. of Mech. Sci., Vol. 43, No 6, pp1387-1403.
- Lin, J., and Dunne, F. P. E., 2001, Modelling grain growth evolution and necking in superplastic blow-forming, Int. J. of Mech. Sciences, Vol. 43, No. 3, pp595-609.
- Lin, J. and Yang, J., 1999, GA based multiple objective optimization for determining viscoplastic constitutive equations for superplastic alloys, Int. J. of Plasticity, Vol. 15, pp1181-1196.
- Lin, J., Dunne, F.P.E. and Hayhurst, D. R., 1999, Aspects of testpiece design responsible for errors in cyclic plasticity experiments, Int. J. of Damage Mechanics, Vol. 8, No. 2, pp109-137.
- Lin, J., Dunne, F.P.E. and Hayhurst, D. R., 1998, Approximate method for the analysis of component under cyclic plasticity damage, J. of Strain Analysis, Vol. 33, No. 1, pp55-65.
- Lin, J., Dunne, F. P. E. and Hayhurst, D. R., 1996, Physically-based temperature dependence of elastic viscoplastic constitutive equations for copper between 20 and 500 oC, Philosophical Magazine A, Vol. 74, No. 2, pp655-676.
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- Lin, J. and Hayhurst, D.R., 1993, The development of a bi-axial tension test facility and its use to establish constitutive equations for leather, European J. of Mechanics, Vol. 12, No. 4, pp493-507.
- Lin, J., Hayhurst, D.R., Howard I.C. and ReedmanD.C., 1992, Modelling of the performance of leather in a uni-axial shoe last simulator, J. of Strain Analysis, Vol. 27, No. 4, pp187-196.

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