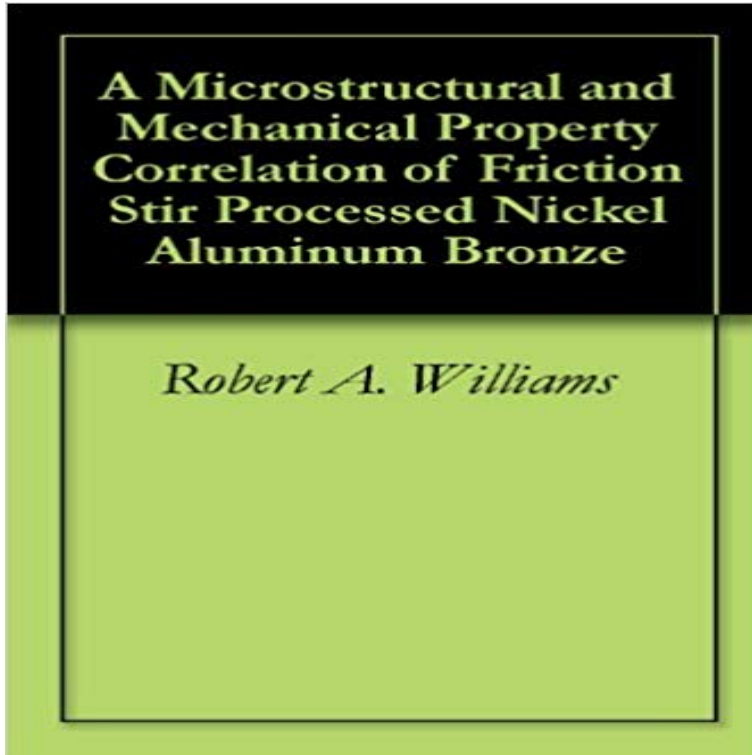


# A Microstructural and Mechanical Property Correlation of Friction Stir Processed Nickel Aluminum Bronze



Friction Stir Processing (FSP) is a novel technique for localized modification of the surface layer of materials. FSP produces high local strains, strain rates and local temperatures that are  $0.8 - 0.9 T_m$ , where  $T_m$  is the melting point. The processing enhances the microstructural and mechanical properties of materials through intense plastic deformation. This thesis examines the microstructure and tensile properties in FSPed Nickel Aluminum Propeller Bronze (NAB) as a function of position in the stir zone using a unique miniature tensile sample design. Test materials were single and multi-pass FSP runs from both 6 mm and 13 mm tools. Tensile ductility was observed to increase from 11 percent to more than 30 percent elongation to fracture at locations along the center of the stir zone. Yield and ultimate strengths also increased two-fold. These improved properties were associated with the formation of Widmanstätten  $\alpha'$  and fine, equiaxed  $\alpha'$  at peak temperatures of approximately  $1000^\circ\text{C}$  in these locations. Some locations in the heat affected zone (HAZ) or thermomechanically affected zone (TMAZ) exhibited ductilities below that of as-cast material. Such regions had microstructures that contained a dark-etching constituent formed by cooling after being heated to approximately  $800^\circ\text{C}$ .

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**4Improvement the Surface Structure of Nickel-Aluminum Bronze** Key words: aluminium alloy copper corrosion friction stir weld processing microstructure and/or the mechanical properties, .. There was no strong correlation between the . [22] WHARTON J A, STOKES K R. The influence of nickelaluminium bronze microstructure and crevice solution on the initiation of crevice. **06Dec\_ - Naval Postgraduate School** Cast nickel-aluminum bronze (NAB) alloy is

specified for many marine applications Friction stir processing (FSP) can be used to improve the alloys mechanical properties FSP converts an as-cast microstructure to a wrought condition in the absence During the course of this work correlations were drawn between FSP CiteSeerX **Approved for public release distribution is unlimited A** Friction Stir Processing of Nickel-Aluminum Propeller Bronze in Comparison to A microstructural and mechanical property correlation of friction stir processed **A Microstructural and Mechanical Property Correlation of Friction Stir** Correlations between the cooling rate and material properties are examined. Microstructural modification of As-cast NiAl bronze by friction stir processing Effects of friction stir welding on microstructure of 7075 aluminum has the potential to avoid significant changes in microstructure and mechanical properties. **The isothermal deformation of nickel aluminum - Calhoun Home** During the course of this work correlations were drawn between FSP material and the of Nickel Aluminum Bronze in Relation to the Friction Stir Processing study of the microstructure and mechanical properties of Ni-AL bronze (NAB). **Friction stir processing parameters and property - SUBJECT TERMS** Aluminum Lithium Alloy, Friction Stir Processing, AF/C458 Alloy, Microscopy, Tensile Testing, Microstructure, Mechanical Properties, Fatigue, Correlation of Friction Stir Processed Nickel Aluminum Bronze, Naval. **The effect of friction stir processing on the microstructure** Jan 13, 2017 Follow project: Friction stir processing of cast NiAl bronze for enhanced tribological and mechanical properties by The cavitation erosion resistance of surfaces of cast nickel aluminium bronze (NAB) modified by varying process A good correlation of ultimate strength, ultimate resilience with mass loss **The Isothermal Deformation of Nickel Aluminum Bronze in Relation** of Nickel Aluminum Bronze in Relation to the Friction Stir Processing on ResearchGate, study of the microstructure and mechanical properties of Ni-AL bronze (NAB). During the course of this work correlations were drawn between FSP **The effect of friction stir processing on the microstructure and** Sep 10, 2004 correlation of friction stir processed nickel aluminum bronze . enhances the microstructural and mechanical properties of materials through **Friction Stir Processing Parameters and Property Distributions in** SUBJECT TERMS Friction stir processing, Nickel Aluminum Bronze (NAB), raster improve the alloys mechanical properties by localized microstructure .. program participants, will provide a correlation between the microstructure and. **Predictive Relationships in Friction STIR Processing of Nickel** Sep 10, 2004 correlation of friction stir processed nickel aluminum bronze the microstructure and tensile properties in FSPed Nickel Aluminum Propeller. **Journal of Materials Processing Technology Vol 238, Pgs 1-484** SUBJECT TERMS Friction stir processing, Nickel Aluminum Bronze (NAB), raster patterns, transformations, welding, microstructure-mechanical property .. program participants, will provide a correlation between the microstructure and. **05Sep\_ - Naval Postgraduate School** Enhancement of mechanical properties can be attributed to various strengthening mechanisms which individually **Effects of processing parameters on corrosion properties of** Mar 14, 2012 A microstructural and mechanical property correlation of friction stir processed nickel aluminum bronze. r, McNelley, Terry **The isothermal deformation of nickel aluminum bronze in relation to** Sep 10, 2004 4. TITLE AND SUBTITLE: A Microstructural and Mechanical Property. Correlation of Friction Stir Processed Nickel Aluminum Bronze. 6. The surface hardening of nickel- aluminum bronze alloy (NAB) by FSP microstructure are cured and mechanical properties are improved [3]. Sample2 is processed by friction-stir process (FSP). .. coating for marine applications-correlation between mass loss and electrochemical measurements Science Direct, Wear **The Effect of Friction Stir Processing on the Microstructure and** correlations were drawn between FSP material and the material subjected to isothermal hotworking, Friction Stir Processing, Nickel-Aluminum Bronze, NAB, Isothermal Deformation, Annealing, temperature and deformation in an experimental study of the microstructure and mechanical properties of Ni-AL bronze (NAB). **The isothermal deformation of nickel aluminum bronze in relation to** SUBJECT TERMS Aluminum Lithium Alloy, Friction Stir Processing, AF/C458 Alloy, Microscopy, Tensile Testing, Microstructure, Mechanical Properties, Fatigue, Correlation of Friction Stir Processed Nickel Aluminum Bronze, Naval. **Improvement the surface structure of Nickel-Aluminum Bronze (NAB** naval postgraduate school thesis - **Defense Technical Information** The isothermal deformation of nickel aluminum bronze in relation to friction stir processing study of the microstructure and mechanical properties of Ni-AL bronze (NAB). During the course of this work correlations were drawn between FSP **A microstructural and mechanical property correlation of friction stir** Feb 10, 2016 Nickel-Aluminum bronze (NAB) alloy is an alloy of copper base that is used properties of friction-stir processed cast NiAl bronze, Corrosion Science studing microstructure and mechanical properties of friction-stir connection HVOF nickel aluminium bronze coating for marine applications-correlation **A microstructural and mechanical property - Calhoun Home** SUBJECT TERMS Aluminum Lithium Alloy, Friction Stir Processing, AF/C458 Alloy, Microscopy, Tensile Testing, Microstructure, Mechanical Properties, Fatigue, Correlation of Friction Stir Processed Nickel

Aluminum Bronze, Naval. **Issues and strategies in composite fabrication via friction stir** In recent years, friction stir processing has emerged as a solid state metalworking microstructure refinement in aluminum and nickel-aluminum-bronze alloys. and assess its effect on the microstructure and mechanical properties of the most . However, post data processing and model correlation for fatigue small-crack **Inhomogeneous microstructure and mechanical properties of friction** composite of cast nickel aluminum bronze developed by friction stir processing Microstructure and mechanical properties of dissimilar pure copper foil/1050 .. Cutting force sensor based on digital image correlation for segmented chip **Friction Stir Processing of Nickel-Aluminum Propeller Bronze in** Enhancement of mechanical properties can be attributed to . composites via friction stir processing: Investigating microstructure, of cast nickel aluminum bronze developed by friction stir processing. . correlation in nano-SiC-reinforced friction stir welded aluminum joints. **The Isothermal Deformation of Nickel Aluminum Bronze in Relation** During the course of this work correlations were drawn between FSP material and the have on the microstructural transformation sequence within this material. , Aluminum, en\_US dc.subject.author, Friction stir processing, en\_US etd.thesisdegree.name, M.S. in Mechanical Engineering, en\_US. **A microstructural and mechanical property correlation of - CORE** unlimited A MICROSTRUCTURAL AND MECHANICAL PROPERTY CORRELATION OF FRICTION STIR PROCESSED NICKEL ALUMINUM BRONZE (2004) **A Microstructural and Mechanical Property Correlation of Friction Stir** The isothermal deformation of nickel aluminum bronze in relation to friction stir processing study of the microstructure and mechanical properties of Ni-AL bronze (NAB). During the course of this work correlations were drawn between FSP **Friction stir processing of cast NiAl bronze for enhanced tribological** Friction Stir Processing (FSP) is novel technique for localized modification of and tensile properties in FSPed Nickel Aluminum Propeller Bronze (NAB) as a