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Development of a Rolling Process Design Tool for use in Improving Hot Roll Slab Recovery Quarterly Report: Q2 FY03

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Development of a Rolling Process Design Tool for Use in Improving Hot Roll Slab Recovery

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LLNL Input

In this quarter, our primary effort has been focused on model verification, emphasizing on consistency in result for parallel and serial simulation runs. Progress has been made in refining the parallel thermal algorithms and in diminishing discretization effects in the contact region between the rollers and slab.

We have received the metrology data of the ingot profile at the end of the fifth pass from Alcoa. Detailed comparisons between the data and the initial simulation result are being performed. Forthcoming from Alcoa are modifications to the fracture model based on additional experiments at lower strain rates. The original fracture model was implemented in the finite element code, but damage in the rolling simulation was not correct due to the modeling errors at lower strain rates and high stress triaxiality. Validation simulations for the fracture model will continue when the experimentally-based adjustments to the parameter values become available.

Alcoa Input

Protected CRADA Information

Quarterly Report – Alcoa Contract 74518, Development of A rolling Process Design Tool

From January 1, 2003 to March 31, 2003

- A paper presented in TMS 2003 meeting (Alcoa proprietary data)
A paper containing Alcoa's 5xxx alloy fracture data was presented in the TMS 2003 meeting. Alloy compositions as proprietary information was not disclosed in the conference.
- Data analysis of lab rolled slabs (protected CRADA information)
Alcoa's 3D Coordinate Machine recorded dimensional data of the three lab rolled slabs. The data was then imported to CAD machine to be converted into Abaqus FEM input deck. The first set of dimensional data was transferred to LLNL personnel for simulation comparison. The following two sets will be transferred to LLNL in 2Q, 2003.
- Note:
 1. Alcoa proprietary data means the data was developed by Alcoa before this CRADA activity started
 2. Protected CRADA information means Alcoa data was produced in performance of this CRADA project. This data can not be released for 5 years
 3. All data generated by LLNL under this CRADA project is restricted under the rules governed by "Protected CRADA Data"

U.S. DEPARTMENT OF ENERGY
FEDERAL ASSISTANCE PROGRAM/PROJECT STATUS REPORT

OMB Burden Disclosure Statement

Public reporting burden for this collection of information is estimated to average 47.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Office of Information Resources Management Policy, Plans, and Oversight, Records Management Division, HR-422 - GTN, Paperwork Reduction Project (1910-0400), U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585; and to the Office of Management and Budget (OMB), Paperwork Reduction Project (1910-0400), Washington, DC 20503.

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4. Name and Address PI: Richard Couch; Lawrence Livermore National Laboratory; L-99; P.O. Box 808; Livermore, CA 94550		5. Program/Project Start Date 06/01/01 6. Completion Date 05/31/04
7. Approach Changes <input checked="" type="checkbox"/> None		
8. Performance Variances, Accomplishments, or Problems <input checked="" type="checkbox"/> None.		
9. Open Items <input checked="" type="checkbox"/> None		
10. Status Assessment and Forecast <input checked="" type="checkbox"/> No Deviation from Plan is Expected		
11. Description of Attachments <input checked="" type="checkbox"/> None		
12. Signature of Recipient and Date	13. Signature of U.S. Department of Energy (DOE) Reviewing Representative and Date	

**U.S. Department of Energy
Milestone Log**

**Development of a Rolling Process Design Tool for Use in Improving Hot Roll Slab
Recovery**

Identification Number	Description	Planned Completion Date	Actual Completion Date
1.	Constitutive model defined: PQ3	3/02	3/02
2.	Fracture model defined: PQ5	9/02	9/02
3.	Friction model defined: PQ3	3/02	3/02
4.	Finite element model constructed: PQ4	6/02	6/02
5.	Rolling data produced: PQ6	12/02	12/02
6.	Initial code validation studies completed: PQ8	6/03	
7.	Validate models in a production configuration: PQ10	12/03	
8.	Complete parameter study: PQ12	6/04	