

PACKAGE ID - 001051SUN0000 CAPS-2D

KWIC TITLE - Casting Process Simulator 2D Mold Fill and
Solidification

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LIMITATION CODE -COPY **AUDIENCE CODE** - LIM

COMPLETION DATE - 03/01/1995 **PUBLICATION DATE** - 03/01/1995

DESCRIPTION - The CaPS software is a tool used to setup, simulate, and
examine the results from two-dimensional filling and
solidification of a sand casting.

PACKAGE CONTENTS - Media Directory; Software Abstract; ANL-93/14; Media
Includes Source Code, READ.ME File, Sample Problems, Installation
Instructions;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - The geometry is described utilizing a parametric
cubic representation. The geometry is approximated by a structured
grid using an automatic mesh generation module. Boundary and initial
conditions are specified with respect to the original geometry and
automatically linked to the approximating mesh. The simulation
module uses a finite volume approach to the solution of the
conservation of mass, momentum, and energy equations. The concept
of Volume of Fluid is used to track the liquid-vid interface. The
enthalpy method is applied to model the solidification.

COMPUTER - SUN

OPERATING SYSTEMS - SunOS 4.1.3 with Open Windows 3.0 or MOTIF and
HP-UX release 9.05

PROGRAMMING LANGUAGES - FORTRAN 77 with some VMS extensions (99%) and C
(1%) plus UNIX System 5 Bourne shell scripts.

SOFTWARE LIMITATIONS - None

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - A visual interface and automatic structured-grid mesh
generation of arbitrary geometries are features of software.

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RELATED SOFTWARE - The proprietary MCAE PATRAN package (PATRAN 2.5 from PDA Engineering) is used to build the geometry and examine the simulation results graphically. The visual interfaces utilizes the commerical HOOPS (HOOPS 3.2 from Ithaca Software) graphics database system.

HARDWARE REQS - Hardware requirements are highly dependent upon the problem being run. As is the case with all workstation applications, problems run significantly faster if there is sufficient real memory to avoid swamping the disk. The amount of disk space required is dependent not only on problem size, but also on the amount of information (time-steps) written to disk for postprocessing. The development of CaPS was carried out on a Sun SPARCstation IPC with 48 Mbytes of memory and on an HP735 with 112 Mbytes of memory. While problems can be run with less than 100 Mbytes of disk space, operation is improved greatly when one or two Gbytes are available.

TIME REQUIREMENTS - Time is dependent upon both the problem being run and the speed and load factor of the platform being used. Actual wall clock time may vary from a few seconds to many days.

REFERENCES - Domanus, H.M., Schmitt, R.C., Ahuja, S, User's Guide for the Casting Process Simulator Software CaPS-2D, Version 1.0, ANL-93/14, July 1993.

ABSTRACT STATUS - Submitted July 10, 1995. Released AS-IS 8/4/95.

SUBJECT CLASS CODE - HT

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
C CODES
COMPUTERIZED SIMULATION
BOUNDARY-VALUE PROBLEMS
COOLING TIME
FINITE DIFFERENCE METHOD
FLOW MODELS
FLUID FLOW
FORTRAN
HEAT TRANSFER
LIQUID METALS
MANUFACTURING
MELTING
PHASE CHANGE MATERIALS
PHYSICAL PROPERTIES
CASTING MOLDS
SOLIDIFICATION
SAND

EDB SUBJECT CATEGORIES -

990200 420200 420400

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SOFTWARE ABSTRACT

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SPONSOR - DOE/CE

PACKAGE TYPE - AS - IS