

NASA TECH BRIEF



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Computer Simulation Program is Adaptable to Industrial Processes

The problem:

Optimization of industrial processes can be greatly aided by computer simulation. Industrial processes, such as kiln drying of lumber, ceramic manufacture, and casting of large concrete structures, which involve heat and mass transfer within porous solids require complex mathematical techniques for adequate computer simulation.

The solution:

The Reaction Kinetics Ablation Program (REKAP), developed to simulate ablation of various materials, provides mathematical formulations for computer programs which can simulate certain industrial processes. The programs are based on the use of nonsymmetrical difference equations that are employed to solve systems of complex partial differential equations.

How it's done:

The REKAP program can be generally adapted to the simulation of processes involving heat and mass transfer by substituting specific parameters into the basic equations. In the kiln drying of lumber, for example, profiles of temperature, humidity, and drying time for woods of different types can be simulated to predict minimum process cost and loss of material. The REKAP program could also be adapted to the

simulation of the manufacture of ceramics, the casting of large concrete structures, and the propagation of forest fires (to determine optimum methods of control).

Note:

1. A discussion of the possible adaptations of the REKAP program is presented in a report entitled "Final Report of New Technology: Analytical Comparisons of Ablative Nozzle Materials". The REKAP computer program is described in a report entitled "Final Report: Analytical Comparison of Ablative Nozzle Materials". Copies of these reports can be obtained by addressing:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B66-10426

Patent status:

NASA encourages commercial use of this innovation. No patent action is contemplated by NASA.

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Category 01