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NASA TECH BRIEF

Ames Research Center

Radial Honeycomb Core

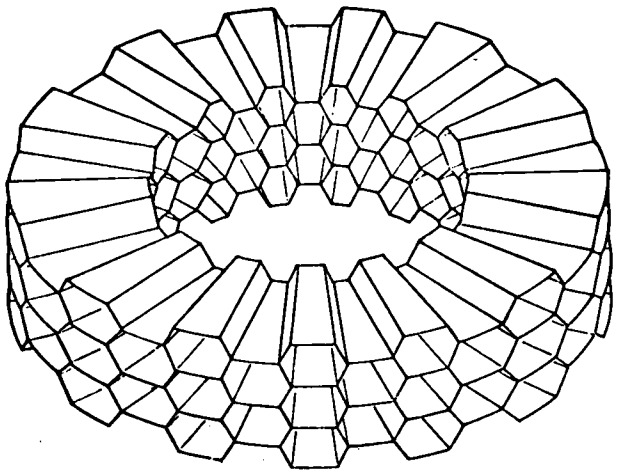
Acoustic specifications may restrict freedom of design of highly suppressed nacelles, such as may be used for STOL aircraft, but the final acoustic lining design is actually a compromise forced on the engineer by space limitations and manufacturing difficulties.

A radial honeycomb core tends to alleviate many of the limitations of conventional nacelle construction methods and offers the following advantages: (1) Deep, high-curvature lines can be readily constructed without the weight penalties of fabricated sheet-metal cells; (2) There is significantly less "lost" area of lining than with fabricated cells (fabricated cells require considerable flange area); (3) There is less "lost" area than with fabricated honeycomb construction because the complete circumference can be formed in one piece rather than as segments which require joints; (4) Cells can be manufactured normal to the duct surface.

The diagram illustrates the radial honeycomb core concept; corrugated walls may be used to provide stiffness. The core is produced from discs with the joined nodes or discs parallel to the radial plane of a cylinder.

The radial core, made of metals or nonmetals, is fabricated either by joining the nodes and then expanding, or by preforming each layer and then joining the nodes. The latter seems more practical for resin-bonded fiberglass, graphite, boron, etc. One method of producing the core from resin-bonded or metallic materials is to preplace adhesive and tack-bond, staple, or rivet the precorrugated layers together at the nodes to provide clamp-up; the assembly is oven-cured.

Although the diagram illustrates a circular honeycomb core, any shape may be constructed (e.g., elliptical) as may be necessary to keep node bond lines and cells normal to contour.



The radial honeycomb core may also be produced from ribbons or strips with the joined nodes or ribbons oriented in longitudinal planes. The ribbon required for the finished shape can be mathematically defined to produce a predetermined cell depth, size, and shape with flat or corrugated cell walls and tapered or constant width node-joints. The ribbon can be preformed and subsequently joined, or joined in the flat and then expanded.

Note:

Requests for further information may be directed to:

(continued overleaf)

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Patent status:

NASA has decided not to apply for a patent.

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