Lockhart and Walker [12] oscilloscope data for irregular unsteadiness trends. However, periodic-average rotor wake velocity defect trends were not in agreement. Schmidt and Okiishi [6] proposed that the periodic-average rotor wake velocity defect was greater when the rotor wake was measured within the chopped inlet guide vane (IGV) wake avenue while Lockhart and Walker [12] suggested that the opposite was true.

Dr. Walker's proposed explanation of the variation of rotor wake periodic-average axial-velocity profile with rotor sampling position (see Fig. 6 of [6]) in terms of *rotor wake* "slip flow" accumulation seems plausible. Perhaps this effect and the IGV wake segment slip flow effect proposed in the present paper both contribute to the trends observed. More definitive data, especially for what is happening at different axial distances downstream from a blade row trailing edge, would help clear up the fluid mechanics involved.

The relationship between Dr. Walker's proposed IGV-rotor wake interaction model and the Kerrebrock and Mikolajczak [10] intra-stator transport of rotor wake segments model should be considered further before definite conclusions are reached.

Annular Diffuser Performance for an Automotive Gas Turbine[1]

S. V. Horn.[2] I would like to express my congratulations to the authors for a very readable paper and a very clear presentation of their work.

I have the following comments on the exhaust diffuser design:

1 Is there a possibility in the automotive gas turbine to fully use the given space limitation for axial-radial bend and thus allow for an increase of the pressure recovery of the whole system?

2 Poor performance of the exhaust diffuser for elevated Mach numbers is caused by the larger longitudal velocity gradient of the core (density change) and by the earlier flow separation.

There is existing procedure for the diffuser design for given inlet Mach number (on the base of the velocity distribution derived from the low inlet Mach number diffusers) which uses the solution of inverse problem and transfer from 2-D plane to axisymmetric plane within the viscous flow model (potential core and boundary layers) [1].

Additional Reference

1 Horn, S. V., "Diffuser Design with Suitable Velocity Distribution," Dissertation (in Czech), SVÚSS Běchovice, 1975.

Authors' Closure

The authors thank Dr. Horn for his discussion of the paper and for bringing to their attention the diffuser design procedure in his dissertation.

The question he poses is interpreted to mean that space limitation of the axial-radial bend prevents diffusion down to a satisfactory regenerator inlet Mach number, say 0.05. Such a situation occurred with the last two engine designs at Chrysler. There was length available to diffuse only to about 0.15 Mach number. Dr. Horn's question then asks whether it is possible for additional diffusion by further use of available space. Presumably, this means the use of flow-spitting devices to increase recovery. These devices have been considered but not employed. One concern is whether there is enough space to make effective use of splitters and yet place them sufficiently far from the turbine exit plane to minimize their influence on the rotor performance. Perhaps experiments should be conducted to investigate the use of splitters.

[1] By D. Japikse and R. Pampreen, published in the July 1979 issue of the JOURNAL OF ENGINEERING FOR POWER, Vol. 101, No. 3, pp. 358–372.

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