This study presents an attempt to reduce the losses produced by interaction between purge flow and main flow in a turbine stage by incorporating circumferential platform contouring. Two contours are proposed and compared against a baseline at different levels of swirl. The computational simulations were performed using a RANS three-dimensional Computational Fluid Dynamics code with the Shear Stress Transport turbulence model. The results of steady simulations demonstrate that for the first contour, when the flow is swirled to 50% of the rim speed, the purge flow exits the cavity with less cross flow. This in turn reduces the strength of the passage vortex. However, at swirl extremes of 0% and 100% the baseline has the best performance. The results show that a carefully designed platform has the potential to reduce losses when the operating condition is in the proximity of 50% swirl.

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The public is welcome to attend.