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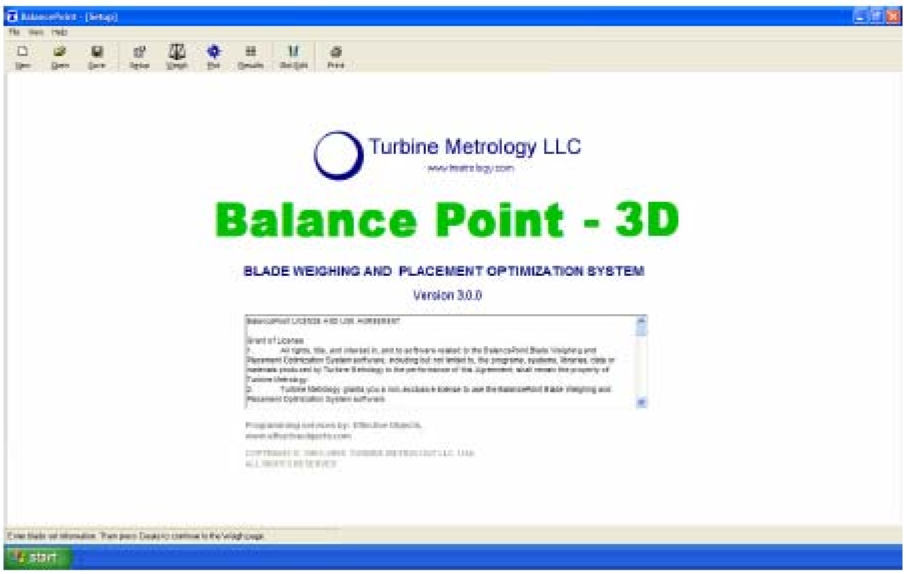
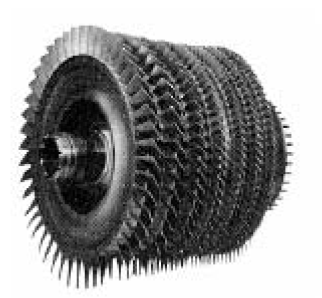
Turbine Metrology Announces BalancePoint 3D

Builders of jet engines and small gas turbines for power generation face unique balancing challenges when assembling their compressor units.



In large conventional turbine construction, discrete compressor blades are attached to the circumference of a discrete wheel, forming one compression "stage". Several stages are then bolted together to form the compressor assembly. In this type of construction, balancing of each stage is relatively straightforward. The wheel, much larger in diameter than in thickness and usually a solid disk, can be statically and dynamically balanced by removing material or adding balance weights. The blades can be arranged so that the variations in mass of the individual blades compensate for each other. Turbine Metrology's popular **BalancePoint** program has helped power generation and jet engine turbine builders world-wide determine compensating blade placement since 2002. Most jet engines and smaller gas turbines, however, require a compressor assembly in which several stages of blades are attached to a single "drum." (Below)



The drum is usually thin-walled and smaller in diameter than in length. Dealing with this very different

geometric aspect ratio is a challenge in itself; the drums are usually dynamically balanced with an unbalance figure developed for each end. Balance weights are then used to bring the drum into nominal balance.

Fitting blades to a drum compressor presents a larger challenge. While each stage's blade set may be arranged for minimal unbalance, the combination of several stages may result in less than desirable balance fore-to-aft in the drum. This unbalance, if uncorrected, might lead to unacceptable levels of vibration in the engine when running at operational speeds.

Turbine Metrology's new **BalancePoint 3D** system achieves a higher level of analysis to provide **optimized balancing of the compressor assembly as a unit**.

In the typical example of a five-stage compressor with 60 blades in each stage, 3 x 10^614 blade placement combinations are possible, far too many to work through by spreadsheet programs or even by more sophisticated algorithmic methods. Using TM's *Dimensional Tunneling Technology*, however, BalancePoint 3D quickly sorts through the **billions and billions of possible blade placement combinations** to arrive at a solution which optimizes the radial and longitudinal balance of the assembled drum. If desired, the **initial unbalance of the un-bladed drum** may also be factored into the assembly. This option eliminates the operator intensive assembly step of fitting balance weights, therefore reducing assembly time and eliminating the weights themselves, which can be improperly installed or lost during rebuilds. By offering this additional level of optimization, BalancePoint 3D helps to further reduce vibration and bearing wear in turbine engines, which in turn increases engine longevity and, in the case of jet engines, passenger comfort

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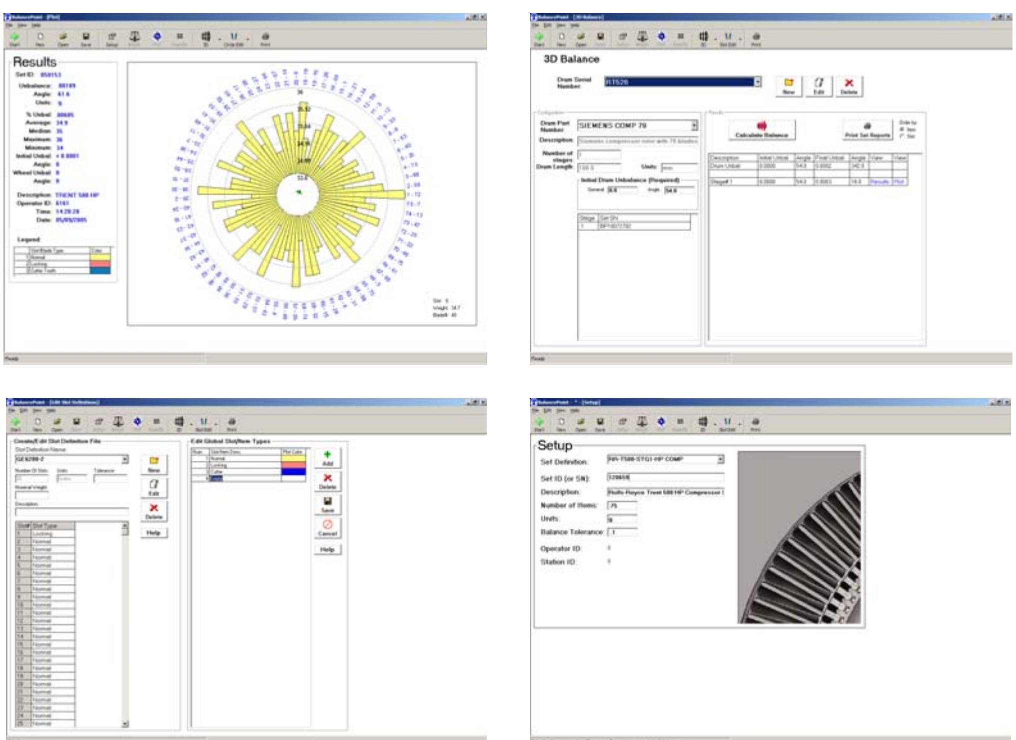

Sample screens, BalancePoint 3D