



REDESIGN OF ROTODYNAMIC PUMPS AND COMPRESSORS

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ABSTRACT: *Rotodynamic Single, Multistage Air Compressors and Single, Multistage Liquid Pumps can be fitted with appropriate Non-Return Valves like Reed Valves after every stage so that the slip and back flow of pressurized fluid can be reduced. Increase in the overall Efficiency of the compressors and pumps are expected.*

Key Words: *Non-Return Valves, Rotodynamic action, Compressors, Pumps, Higher efficiency, Performance.*

INTRODUCTION

Jet Engines used in Aeroplanes have compressors which are compressing atmospheric air and land-based Gas Turbines also have such Compressors. These Compressors are generally multistage. After crossing every stage an appropriate valve like Reed valve can be provided as a design modification. This Design Modification is suggested which can lead to higher efficiency by reducing Back Flow of the fluid.

1.1 Aim of the Present Design:

Lower Power Consumption for Higher Final Discharge Pressure and Volume of the fluid are the expected advantages by addition of the valves at the exit of every stage of Multi Stage pumps and compressors.

1.2 Compressors in Gas Turbines:

Applications of stationary Gas Turbines operations in Power station for Electrical Power production can become more economical by the addition of valves.

Instead of pushing the air for combustion with higher and higher speed by rotodynamic action as in the present design of gas turbines, a positive lock in the form of valve after every stage is suggested. This suggestion is expected to save significant amount of energy spent and the compressors and pumps can reach higher pressure and discharge easily without the back flow.

AERO ENGINES

By incorporating the suggestion of providing valves after every stage in the Jet engines, considerable quantity of fuel saving is expected. Longer distance the planes can fly for same size of fuselage and fuel filled in it, is the anticipated advantage.

2.1 Compartmentalization after Adding Valves:

Providing valves in the rotodynamic fluid pumps and compressors apart from Bleed Valves or pressure control valve, reduction in the total number of stages with lower consumption of power are expected advantages for the same final output Pressure and Fluid flow Volume.

2.2 Pulsatory Fluid Out Put:

Due to the presence of Valve a pulsatory output of fluid flow is anticipated. After crossing every compartment and the corresponding valve in every stage a pulsatory fluid output can be the actual flow.

CONCLUSION

After separation of each stage into compartments and with the provision of non-return valves, possible reduction of back flow and back pressure, an overall improvement in efficiency of the single stage and multistage compressors and Pumps are expected.