Roto TECH

Issue No.1 Quaterly Technical Bulletin

Roto pumps™ 45+ years of ...moving fluids positively

Editorial

We are BACK!!! It gives us immense pleasure to reintroduce Roto Tech.

As a pioneer and leading manufacturer of Screw pumps for over 45 Years, we always felt the need to share our experiences and found Roto Tech as the best medium of communication. It would be our endeavor to share our experiences in fluid engineering and to bring out a deeper and better understanding of the Positive Displacement Pumps so commonly used, but often misunderstood.

This technical bulletin, scheduled to be released every quarter, would focus its attention on design, features, applications, operation and maintenance of various types of pumps and more specifically Screw Pumps.

We have chosen to include an article of great importance and related to the different designs of the Universal Joints used in the Progressive Cavity Pumps. One would be surprised to see the impact on the life cycle costs that these Universal joints in the Progressive Cavity Pumps have. Also, we are presenting a success story of Roto in Paper and Pulp Industry. In place of the existing Centrifugal pumps, Roto installed a Medium Consistency Progressive Cavity Pulp Pump and you will be surprised to read the benefits that the customer enjoyed.

I sincerely hope that you would find the contents of the Roto Tech interesting and useful. We look forward to your valuable suggestions and feedback as this would be a great motivator for us.

Happy Reading!!!

Arvind Veer Gupta

Director Marketing

Roto News

Roto moves even closer to you...

- In addition to Roto's overseas offices in UK and Australia, Roto has further strengthen its presence in Europe by opening a subsidiary in Germany .
- A joint venture with Ecochem Pumps (Pty) Ltd. in South Africa to cater to the Sub Sahara Africa.
- Ali & Sons Oilfield Supplies & Services Co. L.L.C appointed as distributor in UAE.

Other News

- Roto registered with Abu Dhabi Company for Onshore Oil Operations (ADCO).
- Roto bagged a prestigious order for supply of pumping systems for New Abu Dhabi International Airport from Takreer.
- Roto has further strengthen its presence in CAIRN Energy, Mangla site Rajasthan India, by bagging order for their expansion project through L&T, Hydrocarbon.
- Successfully executed the order for supply of vertical pumps from Petro Development of Oman (PDO). The EPC company is Tabodin, Oman.
- Successfully executed a package requiring in total 48 pumps (centrifugal, gear, twin screw & progressive cavity). These pumps will be installed in 2 ships. The owner & shipbuilder being MMA offshore, Singapore.
- Completed the supply of 12 number of mud pumps to SriLanka based ship building company, Colombo Dock Yard. The owner of these vessel are Executive Offshore, Singapore.

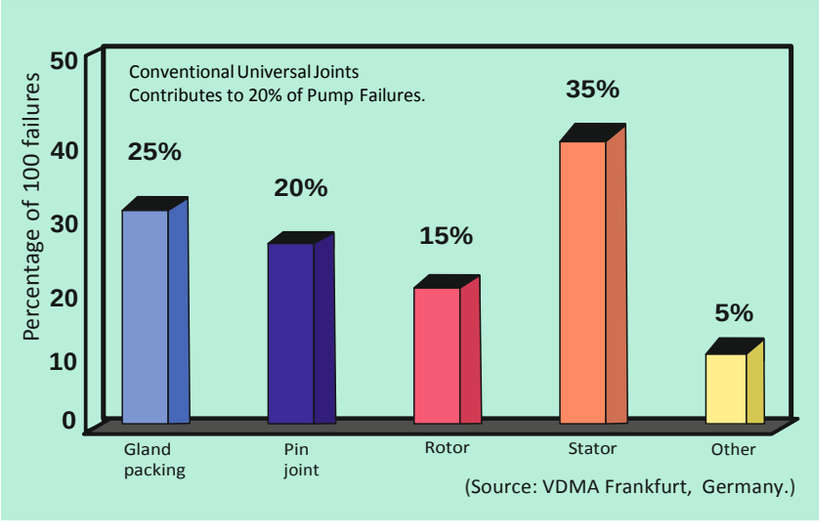
Pump Users International Forum

INNOVATIVE DESIGN CONCEPTS FOR OPTIMIZING LIFE COST OF PROGRESSIVE CAVITY PUMPS;

Due to the ever increasing demands of users on the economic efficiency, there is a continuous pressure on the pump manufacturers to challenge the design of progressive cavity pumps. In this edition of Roto Tech, different design variants for universal joints are presented and discussed with regard to their advantages and disadvantages. By the systematic implementation of innovative design concepts in universal joint, it has been possible to realize a leap in technology & create a new generation of progressive cavity pump on a considerably higher technological level.

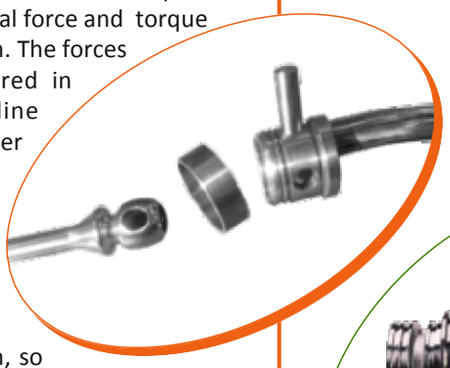
Progressive cavity pumps are a type of positive displacement pump. Like all type of positive displacement pumps, progressive cavity pump capture liquid in a defined cavity. This cavity is created between a rotating member, usually constructed of steel machined into a single helix, and a stationary member, normally molded elastomers, with a corresponding double internal helix that has a pitch length twice that of the rotating member.

An important consideration of drive train design is the unfortunate characteristics of eccentric motion by the helical rotor. This is an inherent feature of the progressive cavity design. The eccentricity of its rotation is actually a design consideration affecting the capacity or cavity volume of the pump: hence, larger pumps have rotors with greater eccentricities than smaller pumps. Of course, the eccentric motion of the rotor cannot be conveyed into the sealing area of the pumps, where mechanical packing or seals must run on a concentric shaft. To accommodate this transition, a variety of mechanical devices have been employed, the most common of which are the universal joints.



Pin and Bush Type Universal Joint

In the widely used pin Joint, the pin transmits forces and moments; i.e. there is no functional separation between axial force and torque transmission. The forces are transferred in undefined line contact under relative motion. Only a short lever arm is available for force transmission, so that sliding contact is established with relatively high surface pressure on the pin. The kinematics of this design principle result in relatively high wear on the pin joints. Systematic analyses of pin joint failures have shown that wear starts in the contact lines of the torque transmission. The axial force acts on the pin, causing angular displacement relative to the bore of the connecting rod, which in turn results in wear' spirals around the pin circumference.



Cardan Type universal joint

A further refinement, capitalizing on the purported advantage of the double pin joint, is the Cardan joint. Everyone should be familiar with this design because of its universal use in the automobile industry.

Accepted and refined over the last 100 years, this joint can absorb massive amounts of thrust load and torque. Dynamic loading is distributed over large surface areas covered with needle bearings. Even when used in applications requiring several hundred horse power, it has proven extremely reliable and durable.

But when applied to a pump, it too has some limitations. The bearings are normally only protected against intrusion from the pumpage of lip seals. Just as these seals are unacceptable for pin joint pumps, so are they unacceptable for Cardan joint pumps. While produced in large numbers and relatively inexpensive, Cardan joints are normally not practically used in applications for less than 75 hp , the power requirement for a fairly small automobile but a fairly large progressive cavity pump. For medium to small pumps, the Cardan joint is too large and will restrict the pumping element inlet.

An interesting characteristic of the Cardan joint is that it must operate with a great deal of angularity. It must “flex”. The motion is required to have needle bearings rotate so they will wear evenly.It becomes a latent advantage and helps to reduce the length of the progressive cavity pumps.