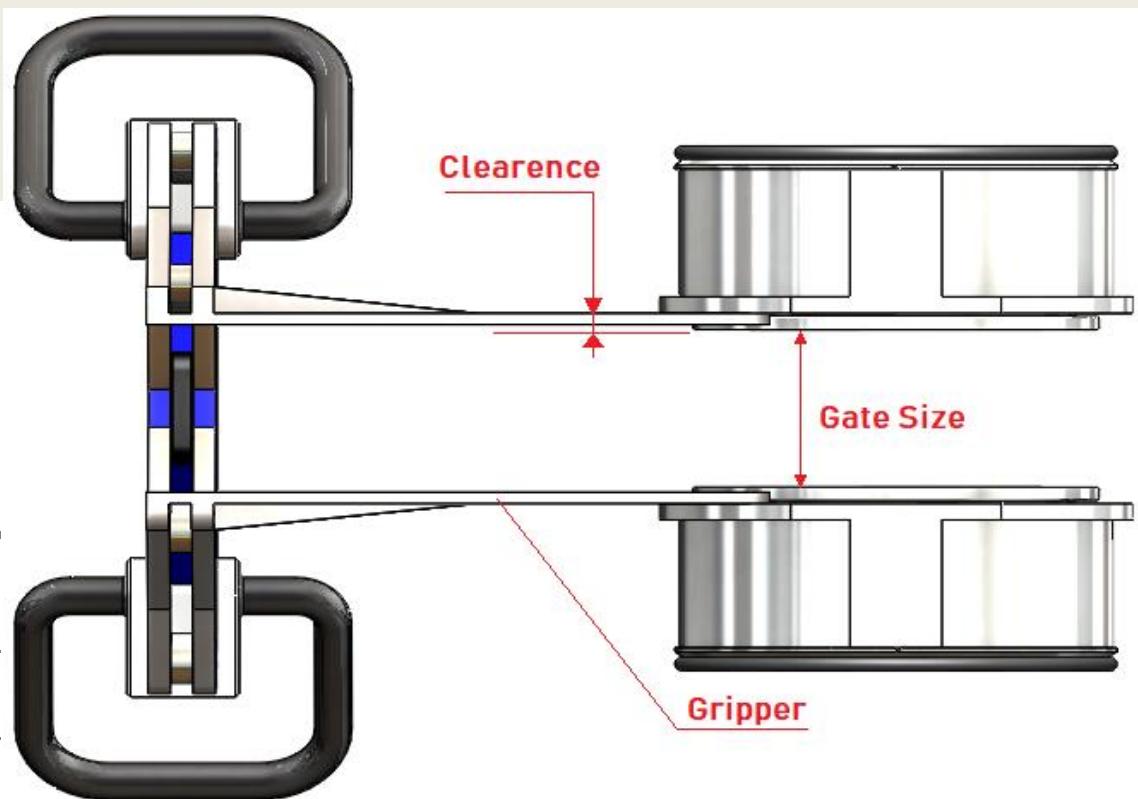


Gripper Special Tool

A special tool for assembling the gate valve in a vertical position



Design of special tool



The conceptual design: how the special tool can hold the two seats in their position.

Abstract

Challenge

When assembling the gate valve in a vertical position such as [Sand filter, Steam exchanger], it is very difficult to hold the upper sealing assembly against the gravity to be able to put the gate in place.

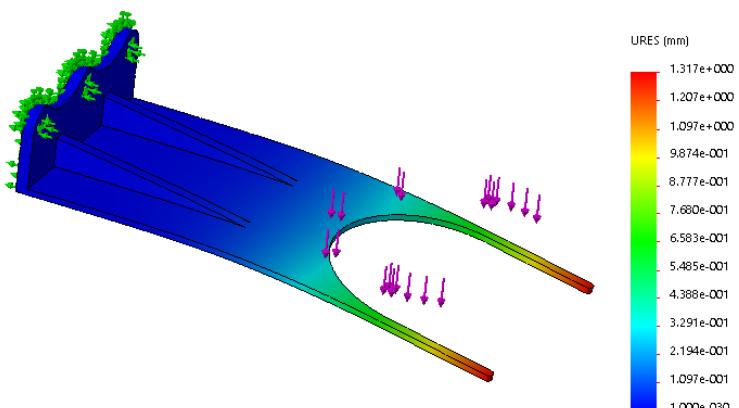
We face many issues in this case:

- **Pinch point** between the seat and gate, where it is impossible to use a hand or fingers to hold the upper seat.
- **Sharp tool** has been used to hold the upper seat and put the gate, and this is a risk to scratch the sealing area by mistake.
- **Much time** taken to assemble the gate valve in a vertical position and working in risk to damage any expensive parts.

Solution

The solution is to design a special tool which can hold the two sealing assemblies in their position and has no sharp edges to avoid damage the sealing area.

- Easy hold it by two hands and using the strength muscles "Smart Grip".
- Easy operate with a mechanical lock mechanism.
- Strong material, cheap, and high corrosion resistant.



MATERIAL TEST: deformation test of stainless steel 316 when applying 10 Kgf on the touching area with retainer. **"This test done by using SolidWorks finite elements calculations"**

Conceptual Design

Design Intent

The aim of design is holding the two seats in place to facilitate assembling the gate in between.

Respecting a small clearance between the gripper and the gate, also avoiding any damage to sealing areas.

Mechanism

The mechanism is simple and provide accurate motion and self-mechanical lock to be easy in use.

It consists of two types:
Screw mechanism converting the rotation motion to a linear motion with a mechanical lock, also this kind of mechanism allows slow and accurate motion.
4 links can expand the gripper usually in parallel.

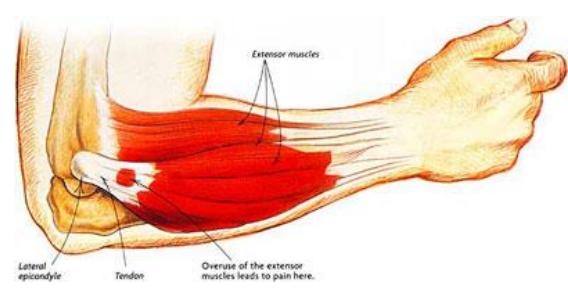
Ergonomics

The special tool is easy to grip by two hands, respecting the comfort way to use it.



Usually using the strength muscles in the arm to hold the special tool without feeling pain during working.

- User friendly.
- Easy to use.
- Light weight.



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