



P&N specialises in the design and manufacturing of bearings for strand guiding rolls. Every segment of a bow casting machine requires a different bearing design. P&N provides all of these different bearing designs.

The strand guiding directly below the mould in segment 0 or segment 1 uses split rolls. This means that there are 2 or 3 rolls running on one shaft. Depending on the strand width, the P&N design has two or three rolls mounted on one shaft. A design with only one single roll is not possible because there would be too much deflection due to the small roll diameter. Every roll is guided by two floating bearings. With two floating bearings, the roll can shift freely in an axial direction (“floating roll”). Temperature-related length expansions of the roll mantle caused by contact with the red hot strand will not damage the bearing. The spiral inner bushings are mounted solidly on the shaft. The other bearing parts like roller cages, spiral outer bushes and side rings are mounted inside the roll. The strand guiding roll with the roller cage which is guided by two side rings can, therefore move freely in an axial direction. The temperature transfer from the strand onto the roll mantle causes an increase of the roll diameter and consequently also of the bearing bore. The spiral outer bush is mounted with pre-load towards the outside. It expands proportionately without losing contact with the expanding bore. The bearing clearance increases accordingly.

The bearings are manufactured from spring steel. Spring steel has an annealing temperature of 350°C. It is, therefore less temperature sensitive than ball bearing steel (100 Cr 6) which has an annealing temperature of 180°C. Materials undergo extreme loss of hardness at temperature loads above the tempering temperature. Therefore, spring steel is better suited at high temperatures.

The spiral bush bushings have pretension which allows easy mounting. The inner bushes (Journal bushings) can be fitted in every suitable location with the help of two hook spanners. The bushings then adhere because of their internal tension. Using drawn materials with a tolerance field h9 or even h11 for the journal is common practise and expensive machining on the journals can therefore be eliminated.

The bearings are sturdy and are insensitive to dirt, scale, water and also hydrophloric acid which forms when casting powder mixes with water. The thin-walled spiral bushings leave a large space for rolling elements with large diameters which can roll over dirt and other foreign bodies and press particles into the coil gap of the spiral bushings. This keeps the running surface of the bearing rollers clean.

The main advantage of the spiral bushing bearings is that the roll jackets can be used many times. It is possible to remachine the roll mantle once it has been worn or bent due to the temperature influence. In this case the bearing seats also must be reworked. In this design, only the spiral outer bushings and not the complete bearings must be exchanged. All the other bearing parts can be used again. The reworking of the bearing seats is done in steps of 1 mm increase of diameter. For example, a bore of 105 mm is increased to 106 mm, and a spiral outer bushing with 1 mm greater diameter is installed. This can be repeated to a diameter of 110 mm. The roller mantles can be reworked up to five times. This results in a substantial cost saving, especially since all other bearing parts may also be reused up to six times.

