D-2 支承の損傷
Damage of Bearings

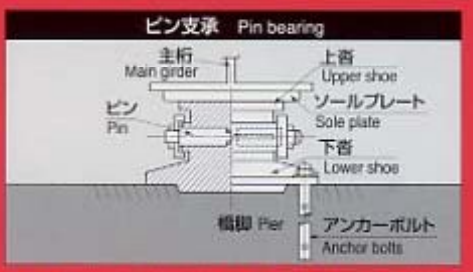
ローラー支承の上沓の逸脱
Deviation of upper shoe

ピン支承の抜け出し
Excessive pin displacement

ピボットローラー支承の破壊
Failure of pivot roller bearing

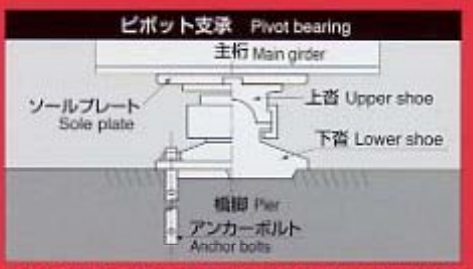
上沓と下沓の間にローラーを配した構造で、橋軸方向の水平および回転機能を持つ可動支承です。

Roller bearing is used for movable support and capable of horizontal movement and rolling. One or multiple rollers are installed between the upper and lower shoes.



上沓と下沓の間にピンを配した構造で、橋軸方向の回転機能を持つ固定支承です。

Pin bearing binds the upper and lower shoes with a pin structure to allow rotation in the axial direction.



上沓を凹面状に下沓を凸面状に、それぞれ球面仕上げして組み合わせ、回転機能を持つ固定支承です。

Pivot bearing is the combination of a concave upper shoe and a convex lower shoe to allow rotation on the contact surface.

変形(移動や回転)をゴムの弾性変形で吸収させる支承です。鉛直反力によるゴム材の膨出を制御するため、ゴム層間に鋼鈑を挿入した積層タイプが多く用いられます。

Rubber bearing absorbs displacement by movement or rotation with the elastic deformation of rubber material. To minimize the swelling of rubber layers under the vertical stress, laminated steel plates between rubber layers are inserted.

橋梁上部構造物は温度や活荷重によって変形します。変形による余分な力が橋脚に伝わらないようにする装置が支承です。
支承には、その仕組により支承板支承、ピン支承、ローラー支承等様々なタイプのものがあります。もともと支承部には地震力が集中しやすいことから、3号神戸線でも多くの支承が損傷しました。

Bridge structures are subject to deformation by temperature change and live loads. Bearings are primarily designed not only to absorb these regular deformations but also to prevent excessive inertial force from being transmitted from pier to superstructure in case of big earthquake. During the 1995 Hyogo-ken Nanbu Earthquake, most of conventional bearings could not sustain the force and were damaged severely. Learned from this experience, they are now considered a primary component of the bridge structure, and in the new construction they are based on the ductility design method to ensure that they can keep the function even in a large-scale earthquake.