Table 1 Parameters of connector specimens

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type** | **No.** | **Length (mm)** | **Height (mm)** | **Thickness of Connecting Steel Plate (mm)** |
| Welded connector | ZB5-1 | 230 | 50 | 8 |
| ZB7.5-1 | 230 | 75 | 8 |
| ZB10-1 | 230 | 100 | 8 |
| Integral connector | JB5-1 | 230 | 50 | 35 |
| JB7.5-1 | 230 | 75 | 35 |
| JB10-1 | 230 | 100 | 35 |

Table 2 Description of specimen failure phenomena

|  |  |
| --- | --- |
| **No.** | **Failure phenomenon** |
| ZB5-1 | 70kN: Initial cracking observed in welds on both side connecting plates.  85kN: Severe weld cracking accompanied by significant connector deformation. |
| ZB7.5-1 | 80kN: Bending deformation initiated in central steel pipe.  128kN: Weld cracking propagated to both sides with pronounced connector deformation. |
| ZB10-1 | 120kN: Bending deformation occurred in left high-strength bolt.  165kN: Extensive weld cracking on both sides with marked connector deformation. |
| JB5-1 | 80kN: Minor connector deformation detected.  110kN: Fracture developed in wall of central rebar insertion hole. |
| JB7.5-1 | 174kN: Fracture of left high-strength bolt without noticeable connector deformation. |
| JB10-1 | 172kN: Left high-strength bolt fracture occurred while maintaining connector dimensional stability. |

Table 3 Material parameter indices

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Component** | **Yield strength**  ***fy* (MPa)** | **Ultimate strength**  ***fu* (MPa)** | **Elastic modulus**  ***E* (N/ mm²)** | **Poisson's ratio**  ***ν*** |
| Connector | 497.8 | 647.2 | 210000 | 0.3 |
| Rebar | 426.6 | 607.9 | 200000 | 0.3 |
| Gasket | 436.3 | 597.8 | 206000 | 0.3 |

Table 4 Main parameter specifications of the connector

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | ***T* (mm)** | ***H* (mm)** | ***M* (mm)** |
| YH-1 | 6 | 75 | 20 |
| YH-2 | 7 | 75 | 20 |
| YH-3 | 8 | 75 | 20 |
| YH-4 | 7 | 75 | 15 |
| YH-5 | 7 | 75 | 25 |
| YH-6 | 7 | 70 | 20 |
| YH-7 | 7 | 80 | 20 |
| YH-8 | 7 | 90 | 20 |

**Note:** *T*: Thickness of the central installation hole. *H*: Height of the connector. *M*: Minimum thickness of the connecting steel plate.