This sheet-metal column part is made of 1.5 mm-thick DC01AM+ZE galvanized steel sheet. As a typical long bent component, it integrates punching, precision bending and welding, which places high demands on dimensional control, geometric tolerance accuracy and surface quality in sheet-metal fabrication. A short section cut from this long-strip part is displayed for exhibition purposes (no spot welding is applied on this exhibited sample).

In terms of key technical requirements specified in the drawing, the primary challenge lies in straightness control for this long component. With an overall length of 1705 mm, it is a slender sheet-metal workpiece. Thin long-gauge parts are highly prone to twisting and warping during shearing, punching and bending. Special straightness requirements are defined on the drawing, representing the core assessment criterion for this fabrication task. During blanking, flatness of cut sheets and burr control directly affect subsequent processes. Excessive burrs on sheet edges will not only scratch the galvanized coating, but also induce uneven stress under bending load and aggravate workpiece distortion. It therefore tests operators' meticulous control over shearing and punching operations.

Bending is the key scoring item for this part. Multiple dimensional tolerances are specified as ±0.3 mm on the drawing. The bending angle is required to be 90° ±0.5° , and the bent dimension is 48±0.3 mm. Great difficulties exist in controlling bending radius and springback. For long-part bending, operators need repeated trial-and-error adjustment for segmented bending sequences and repeat positioning accuracy of the machine back-gauge. During bending, springback of the 1.5 mm galvanized sheet shall be taken into account for reasonable angle compensation to prevent angle out-of-tolerance. Meanwhile, uniform clamping force is required to avoid local sheet indentation caused by excessive pressing and damage to the galvanized surface. The cross-section features multi-bend forming with interrelated bent edges. Deviation in one dimension will trigger cascading errors, which thoroughly tests operators' drawing-reading capability and bending-process planning competence.

Multiple sets of precision holes are distributed on the drawing: 4 × Φ7, 4 × Φ6.2 and one row of Φ6.08 holes. High positional accuracy is required for hole spacing. Offset punching positions will directly impair assembly performance. The punching process shall ensure hole edges are free from tearing and prominent burrs.

High quality awareness is required from operators. Apart from qualified dimensions, surface appearance is also included in scoring. Galvanized surfaces must be free from scratches, indentations and zinc peeling. Defects such as bending marks, welding scars and collision dents will result in point deductions. Workpiece protection shall be implemented throughout the whole manufacturing process.

To sum up, this sheet-metal column features complete process chains and prominent technical difficulties. It comprehensively evaluates operators' capabilities in drawing

interpretation, process planning, bending, welding, precision inspection and workpiece straightening. To achieve qualified production, operators must arrange processing sequences rationally, prioritize deformation control during blanking and punching, accurately compensate bending springback, strictly restrain welding-induced thermal distortion, correct straightness after fabrication, inspect dimensional tolerances item by item, and balance dimensional accuracy as well as surface quality. It fully demonstrates the professional competence of modern sheet-metal workers for precision manufacturing.