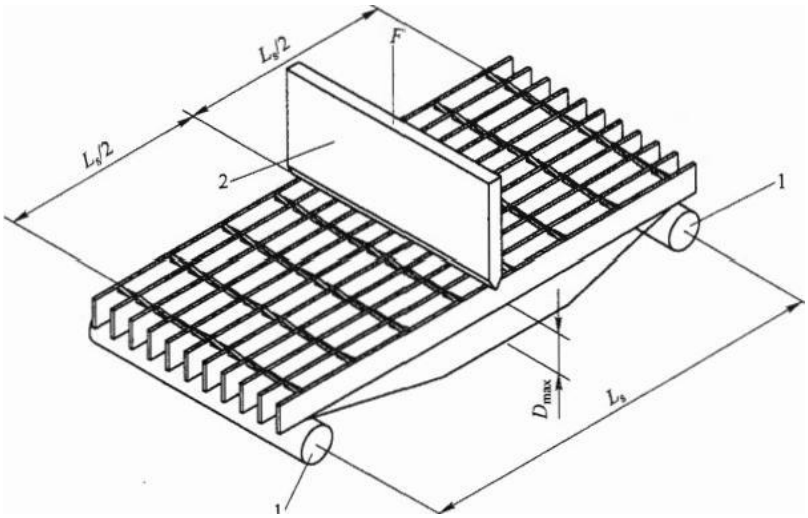
Appendix A
(Normative Appendix)
Static Load Testing of Steel Grid Plate

A.1 Testing Method

The static load performance of steel grating was tested using the bending test method. The bending deflection of the steel grating under concentrated load applied at the mid-span was measured to verify design requirements and conduct quality inspection of the steel grating products.

A.2 Inspection Device

The static load performance test was conducted using a roller-type bending apparatus, as shown in Figure A.1.



explain：

1 — — Support roller;

2 — — Press head.

Figure A.1 Static Load Testing Device

A.3 Inspection Equipment

A.3.1 Testing shall be conducted on a universal material testing machine, which must possess Class 1 accuracy and a load capacity 25% greater than the sample's test load requirements.
A.3.2 Load measurements shall be accurate to within 3%.
A.3.3 The dial gauge used for deflection measurement shall have an accuracy of 0.01 mm.

A.4 Sample Preparation

A.4.1 The manufacturer may prepare load test specimens for steel grating using identical materials and manufacturing methods for each specification or batch of products, or select load test specimens from any product. The quantity of specimens may be determined by the manufacturer based on batch size or agreed upon by both parties involved.

A.4.2 Sample Processing

A.4.2.1 The three contact surfaces between the specimen and the testing machine shall be flat, ensuring good contact with each load-bearing flat steel bar. The specimen must be properly secured.

Leveling of the ground.

A.4.2.2 If it is not possible to ensure proper contact between the three support surfaces and each load-bearing flat steel bar, mechanical processing may be employed to grind or mill the contact areas. After processing, the remaining width of the load-bearing flat steel bar at these locations should comply with the negative tolerance range specified in Table 1 of the standard text. The processed sample is shown in Figure A.2.

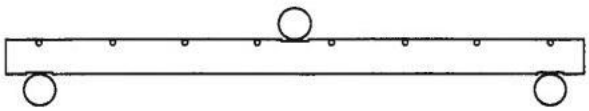


Figure A.2 Processed sample

A.4.3 Sample Size

a) Sample width: ~305 mm; sample lengths: 680 mm and 1150 mm.

b) The load-bearing flat steel has a thickness of b and a width of d.

A.4.4 Number of flat steel bars loaded on the specimen

A.4.4.1 Different specifications and models of steel grating plates have varying central spacing for load-bearing flat steel bars. The number of load-bearing flat steel bars in the specimen and its actual width also differ.

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A.4.4.2 Record the number of flat steel bars (n) carried by the specimen during the test.

A.5 Design value F of the mid-span concentrated load on the specimen and maximum allowable deflection D under the mid-span concentrated load.

A.5.1 The design value of the central concentrated load on the specimen is calculated using Equation (A.1):

$$F= 2nfo\&^{2}/3L, \quad \ldots \ldots \ldots \ldots\ldots\ldots\ldots (A.1)$$

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Formula:

F — Design value of transverse central concentrated load under test, measured in Newtons (N);

n — Number of flat steel bars loaded on the specimen;

f — Design value of flexural strength for steel materials (see Appendix C Table C.1, unit: Newton per square millimeter Nmm²);

b-Load-bearing flat steel thickness, in millimeters (mm);

d-Width of the flat steel bearing plate, in millimeters (mm);

L — Span (roller spacing), unit: millimeters (mm).

A.5.2 The maximum allowable deflection under the design value of transversely concentrated load is calculated using Equation (A.2):

$$D.=fL'/6yEd \quad \ldots \quad \ldots\ldots\ldots\ldots\ldots\ldots (A.2)$$

$$\ldots \quad D.=fL'/6yEd \quad \ldots \quad \ldots\ldots\ldots\ldots\ldots\ldots (A.2)$$

Formula:

D. — Maximum allowable deflection value under transversely concentrated load, measured in millimeters (mm);

f — Design value of flexural strength for steel materials (see Appendix C Table C.1), expressed in Newtons per square millimeter (N/mm²);

L_3 — Span (roller spacing), measured in millimeters (mm);

γ — the bending stiffness adjustment coefficient for flat steel bearing, with y=0.729;

E — Elastic modulus of steel, measured in newtons per square millimeter (N/mm²);

d-Width of the flat steel bearing, in millimeters (mm).

A.6 Load Testing

A.6.1 When the sample length is 680mm with roller spacing of 600mm, or 1150mm with roller spacing of 1000mm, the roller length shall exceed the sample width.

A.6.2 Apply a load steadily to the center of the specimen perpendicular to the direction of the load-bearing flat steel using the testing machine's press head, with the press head length exceeding the specimen width.

A.6.3 Test Load

The design value of the mid-span concentrated load calculated according to A.5.1 shall be used as the test load.

A.6.4 Preloading before testing

A.6.4.1 To ensure proper contact between the support roller and press head with each load-bearing flat steel strip, apply 80% of the test load as preload to the sample center and maintain the load for 15 minutes.

A.6.4.2 Zeroing of the dial gauge after unloading.

A.6.5 Load Testing

A.6.5.1 Inspection Load F: Apply progressive graded loading, with each load level not exceeding 20% of the maximum load. Maintain static conditions for 3 minutes after each loading stage.

Hold time: Apply the load to the specified value and maintain it for 15 minutes.

A.6.5.2 Measure the maximum deflection Dmx of the sample using a dial gauge before unloading.

A.6.5.3 Measure the residual deflection of the sample using a dial gauge after unloading.

A.6.5.4 After unloading, inspect and document sample deformation conditions such as delamination, de-welding, and lock release instability.

A.7 Load Test Result Evaluation

A.7.1 The measured maximum deflection before test load unloading shall not exceed the allowable maximum deflection value under mid-span concentrated load.

$$D_{max} \leq D. \quad \text{..... ....(A.3)}$$

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A.7.2 After unloading, the crossbar of the sample shall remain welded or locked.

A.7.3 After unloading, the specimen shall not deform or lose stability, with residual deflection not exceeding 1/1000 of the span.

A.8 Inspection Report

The inspection report shall include the following information:

a) Material, model specifications, and batch number of the steel grid plate;

b) Measurement records of sample number, dimensions, and load-bearing flat steel dimensions;

c) Equipment used for inspection, measuring instruments, and calibration records;

d) Inspection date and environmental temperature records;

e) Record the test load values, application locations, duration, and measured maximum deflection;

f) Details of any failure (rupture), permanent deformation records or photographs;

g) Inspection data organization and result evaluation report;

h) Name, position, and qualifications of the inspection responsible person;

i) Signature of the inspection responsible person