



**NATIONAL STANDARD OF THE
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Load code of nonferrous metals engineering structures

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1.0.1 This Code is formulated, in order to meet the needs of non-ferrous metal

engineering construction, AND meet the requirements of industrial buildings and structures, that are safe, applicable, economically reasonable.

1.0.2 This Code is applicable to the structural design of the main works and auxiliary

facilities, for new construction and expansion of non-ferrous metal mining, smelting, processing projects.

1.0.3 The actions, which are involved in the design of non-ferrous metal engineering structures, shall include direct actions (i.e., loads) and indirect actions (including temperature, deformation, etc.). This Code mainly stipulates the direct effect; the relevant provisions also apply to the indirect effect.

1.0.4 All kinds of loads and actions, which are used in non-ferrous metal engineering

structures, shall not only comply with this Code, but also comply with the current relevant

national standards.

2.1.1 Action

It is divided into direct action and indirect action. The concentrated or distributed force, which is exerted on the structure, is a direct action, that is, a load; the cause of the external deformation or restrained deformation of the structure is an indirect action.

2.1.2 Permanent load

A load, whose value does not change with time, OR whose change is negligible as compared to the average value, OR whose change is monotonic and can approach the limit value, during the service life of the structure.

2.1.3 Variable load

A load, whose value varies with time AND whose variation is not negligible, as compared to the mean, during the service life of the structure.

2.1.4 Accidental load

A load, which does not necessarily occur, during the service life of the structure; however, once it occurs, its value is large AND has a short duration.

2.1.5 Equivalent uniform live load

A load, whose actual load that is discontinuously distributed is replaced by a uniform load, so that the load effect obtained on the structure can be consistent with the actual load effect.

2.1.6 Working load

Under normal production conditions, the load on the floors and grounds, which is comprehensively generated by operators and their routine tools and appliances, the quantitative materials, semi-finished products, finished products, small mobile conveying devices necessary for production, as temporally stored in the production process.

2.2 Symbols

G_k - The nominal value of permanent load;

Q_k - The nominal value of variable load;

S_{Gk} - The nominal value of permanent load effect;

S_{Qk} - The nominal value of variable load effect;

SAd - The design value of accidental load effect;

Sd - The design value of the load combination effect, in the limit state of the bearing capacity;

Sds - The design value of the load combination effect, in the limit state of normal use;

Rd - The design value of the resistance of the structural member;

C - The specified limits required for normal use, which are reached by the structure or member;

3.1 Classification of loads

3.1.1

The load of non-ferrous metal engineering structure can be divided into three types. permanent load, variable load, accidental load.

3.1.2

The permanent load shall include the weight of various devices, such as equipment, furnace, pipeline, silo, facilities, etc., including the fixed configurations, which meet the production process requirements; the constant weight of materials; the self-weight of components, accessories, protective layers of the building structure; the fixed soil, bulk material, liquid pressure, prestress.

3.1.3

The variable loads shall include the working loads on floor and ground, as well as the loads such as dynamic machines, cranes, storage materials, etc. under normal annual production conditions; the maintenance and installation loads under abnormal production conditions; the load of wind, snow, ash deposits; the temperature actions, deformation actions, frequent earthquake actions.

3.1.4 Accidental loads shall include explosions, impacts, fires, or other huge but short-

term loads, which are caused by accidental accidents, loss of control and other accidental factors, as well as rare earthquake actions.

4.1 General requirement

4.1.1

The structural design of non-ferrous metal engineering shall distinguish the design conditions, according to different production conditions and environmental conditions. The corresponding load combination shall meet the following conditions.

4.1.2

Under permanent design conditions, maintenance and installation loads and accidental loads shall not be involved in the load combination.

4.2 Combination values of load effect

4.2.1

For the engineering structure design, it shall be based on the actual production process, equipment configuration, etc., to carry out load combinations, respectively, under the limit state of bearing capacity and the limit state of normal use of the structure, for the loads, which may occur simultaneously in the process of use; meanwhile it shall adopt each most unfavorable combination. Commonly used load combinations shall be divided into basic combination, nominal combination, quasi-permanent combination, frequent combination, accidental combination.

4.3 Load coefficients

4.3.1

The partial load coefficient of the basic combination shall be adopted, according to the following provisions.

4.3.4

The combination value coefficient, frequent value coefficient, quasi-permanent value coefficient of the variable load of the factory floor and ground can be adopted, according to the actual project. However, in any case, the combination value coefficient shall not be less than 0.70; the frequent value coefficient shall not be less than 0.70; the quasi-permanent value coefficient shall not be less than 0.60.

4.4 Reduction of variable loads

4.4.1

For the floor working load of the factory building, it shall not be reduced, when calculating the primary beam, secondary beam, slab; when calculating the walls, columns, foundations of multi-floor and high-rise factory buildings, it can be reduced, according to the number of floors, OR according to the engineering experience and actual situation.

4.4.3

For the variable load on the ground of the factory building, it can be reduced when it is used for checking and calculating the underground structural components. When the variable load is greater than 5.0 kN/m² AND the subordinate area is greater than or equal to 50 m², the reduction coefficient of the load can be taken as 0.80. For the factory floor of non-ferrous metal processing engineering, the reduction of variable load shall comply with the relevant