
INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

Technical Code for Safety of Buildings Demolishing
and Removing

JGJ 147-2004

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Notice on Promulgation of the Industry Standard
“Technical Code for Safety of Buildings Demolishing
and Removing”

The “Technical Code for Safety of Demolishing and Removing of Buildings” is now approved as an Industry Standard with the Number of JGJ 147-2004, which shall take effect on May 1st, 2005. Herein Clause 4.1.1, 4.1.2, 4.1.3, 4.1.7, 4.2.1, 4.2.3, 4.3.2, 4.4.2, 4.4.4, 4.5.4 and 5.0.5 are mandatory clauses, which must be implemented strictly.

This Code is issued by China Construction Industrial Publisher under the organization of the Institute of Standards and Quotas of the Ministry of Construction of the People's Republic of China.

Ministry of Construction of the People's Republic of China

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Preface

This Code is published by the Code Revision Group on the basis of the requirements in Document JB [2003] No. 104 issued by Ministry of Construction of the People's Republic of China. During the period of revision of this Code, the Code Revision Group carried out extensive investigation and research, earnestly summarized foreign and domestic scientific achievements and massive practical experience and widely solicited the public opinions.

The main contents of this Code include:

1. General Provisions;
2. Construction Preparation;
3. Safe Construction Management;
4. Safety Technology Management;
5. Housekeeping Management.

Ministry of Construction of the People's Republic of China is responsible for the management of this Code and the interpretation of the mandatory clauses, and Beijing Construction Engineering Group Co., Ltd. is responsible for the interpretation of the specific technical contents.

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1 General

- 1.0.1 In line with the characteristics of buildings demolishing and removing, this Code is formulated with a view to implementing the national laws and regulations related to work safety, ensuring work safety throughout building demolishing and removing process, guaranteeing personal safety for the working personnel involved in the said process and ensuring the safety of the people's life and property.
- 1.0.2 This Code is applicable to work safety and management for demolishing and removing of industrial and civil buildings, structures, municipal infrastructures, underground facilities and auxiliary facilities of the houses.
- 1.0.3 The Owner referred in this Code shall be the one which has obtained the Permit for House Demolishing and Removing or the approval documents issued by the planning authority. The Contractor referred in this Code means the one which is qualified for undertaking blasting demolition and the demolishing tasks in connection therewith.
- 1.0.4 The building demolishing and removing works must be undertaken by the contractor who is professional and qualified in blasting or dismantling, and any subcontracting is strictly prohibited.
- 1.0.5 The building demolishing and removing shall not only comply with the requirements as laid out in this Code, but also follow the relevant provisions of the current mandatory standards.

2 General Provisions

- 2.0.1 The Project Manager must take the overall leadership responsibility for work safety of the demolishing and removing works. The full-time safety inspector shall be designated as required to check and ensure all safety-related technical measures in proper place.
- 2.0.2 The Contractor shall fully understand the drawings and data related to the demolishing works, conduct site investigation and establish the Construction Management Plan or develop Safe Work Method Statement.
- 2.0.3 The solid enclosed fence and conspicuous warning signs shall be provided in the work area of the demolishing and removing works, with the height of the fence not less than 1.8 m. The non-essential personnel are not allowed to enter into the work area. When the safety distance between the roadside building to be demolished and the traffic road cannot meet the requirements, the corresponding safety isolation measure must be taken.
- 2.0.4 The emergency response plan for work safety accidents must be developed for the demolishing and removing works.
- 2.0.5 The Contractor shall cover personal accident insurance for the personnel engaged in the demolishing and removing works.
- 2.0.6 Cross job is strictly prohibited in the demolishing and removing works.
- 2.0.7 When the operator use hand-held equipment and tools, overload or fault operation shall be strictly prohibited.
- 2.0.8 The construction waste in the building shall be carried down through closed waste pipes or garbage bags, and any throwing-down is prohibited.
- 2.0.9 In consideration of the jobsite work environment of the demolishing and removing works, the relevant fire safety measures shall be developed. The fire lane shall be laid out in the jobsite with adequate fire water supply guaranteed and sufficient fire-fighting equipment equipped.

3 Construction Preparation

- 3.0.1 While signing the construction contract with the Contractor, the Owner shall sign the work safety management agreement with the Contractor to define the safety management responsibilities of both parties. The Owner and the Supervision Company shall be responsible for the inspection and supervision of the work safety of the demolishing and removing works. The Contractor shall be directly responsible for the safety technology management of the demolishing and removing works.
- 3.0.2 The Owner shall award the contract of the demolishing and removing works to the Contractor with the required qualification. Within 15 days before the commencement of the demolishing and removing works, the Owner shall submit the following documents for filing to the competent construction administrative department of the local people's government above the county level where the construction project is located:
- 1 Qualification registration certificate of the Contractor;
 - 2 Description of the buildings and structures to be demolished and the adjacent buildings likely to be affected.
 - 3 Construction Organization Plan for demolishing/removing works or Safe Work Method Statement;
 - 4 Measures for waste stacking and removing.
- 3.0.3 The Owner shall provide the follow information to the Contractor:
- 1 The relevant drawings and data related to the demolishing and removing works;
 - 2 Layout of the aboveground and underground buildings/ facilities in the areas involved in the demolishing and removing works.
- 3.0.4 The Owner shall be responsible for the cutoff and transfer of the pipes and lines affecting the safe proceeding of the demolishing and removing works. When overhead lines or cable lines are found outside the building, the relevant department shall be contacted in advance and the relevant protective measures shall be taken accordingly. The work can only be commenced after no safety hazard is confirmed.
- 3.0.5 When the demolishing and removing may endanger the safety of the adjacent buildings, the corresponding protective measures must be taken, and the evacuation and placement shall be performed for the people inside the building.
- 3.0.6 Before the demolishing and removing operation, the Contractor shall inspect all the pipes and lines in the building, and no work is allowed before the pipes and lines are cut off.

3.0.7 During the demolishing and removing works, if unknown object is found, the work shall be suspended immediately with corresponding emergency measures taken. Care shall be taken to protect the site, and the relevant department shall be notified in a timely manner.

4 Safe Construction Management

4.1 Manual Demolishing and Removing

- 4.1.1 When the manual demolishing and removing operation is conducted, people gathering or material piling on the floor slab shall be strictly prohibited, the operators shall stand on the steady structure or scaffold, and a safe place shall be provided for the removed components.
- 4.1.2 The manual demolishing and removing operation shall be performed by level and section from the top to the bottom, with vertical cross operation not allowed. Holes or openings on the operation surface shall be closed.
- 4.1.3 When the building wall is demolished manually, hollowing-out or pushing-down method shall be strictly forbidden.
- 4.1.4 The demolishing and removing of the components such as railings, stairs, floor slabs, etc. shall be matched with the overall demolishing and removing progress of the building structure. It is strictly forbidden to demolish the components first. The bearing beam and column of the building shall not be demolished and removed before all the components thereon are demolished.
- 4.1.5 When the beam or hanging structural component is demolished or removed, the support at both ends shall not be cut off before effective falling protection measures are in place.
- 4.1.6 When the column is removed, the reinforcement bar shall be chiseled out along the column bottom, with manual chain block to be used for directional traction. Afterwards, gas welding shall be used for cutting off the reinforcement bars in the three sides of the column, while the front reinforcement bar in the traction direction shall be reserved.
- 4.1.7 When pipes and containers are removed, the nature of the residue must be identified. No demolishing and removing operation is allowed before the relevant safety measures are in place.

4.2 Mechanical Demolishing and Removing

- 4.2.1 When machinery is used for demolishing and removing of buildings, the demolishing and removing shall be conducted by level and section from the top to the bottom. The non-bearing structures shall be demolished first, followed by the bearing structures. When the frame structure building is demolished, the work must be conducted in the sequence of floor slabs, secondary beams, main beams and columns. For the buildings to be partially demolished and removed, the sections to be reserved shall be reinforced first before the commencement of the demolishing of the target part.
- 4.2.2 During the demolishing operation, designated personnel must be assigned to monitor the condition of the building to be demolished, and make the record accordingly. In case that any unsteady

condition is found, the operation must be stopped, and the effective measures shall be taken to eliminate the potential danger.

- 4.2.3 For the demolishing and removing operation, the work shall be conducted in accordance with the mechanical equipment and lifting scheme as specified in the Construction Management Plan. Overload operation or arbitrary extension of the operating scope shall be strictly prohibited. The site used for the mechanical equipment shall have adequate bearing capacity. During the operation, the machines are not allowed to rotate and travel at the same time.
- 4.2.4 When the demolishing and removing operation is performed at height, the large component or heavy materials must be lifted down by a crane in time. The materials demolished and removed shall be promptly cleaned and piled by category at the designated site, with throwing-down strictly prohibited.
- 4.2.5 When double crane lifting is employed in operation, the load of each crane shall not exceed 80% of the permitted load, and the trial lifting shall be performed for the first operation. Two cranes must maintain the synchronous operation during the work process.
- 4.2.6 The crane operator in the lifting operation must strict observe the operating instructions. The signal commanding personnel must conduct the operation in accordance with the provisions as set forth in the current national standard *Commanding Signal for Lifting and Moving (GB 5082)*.
- 4.2.7 When the steel roof truss is demolished and removed, the sling must be used to firmly fasten the steel roof truss. Gas cutting can only be performed after the crane is in steady state. During the lifting process, auxiliary measures shall be taken to enable the lifted object to be in the stable state.
- 4.2.8 When a bridge is demolished and removed, the ancillary facilities on the bridge surface, such as hanging parts, railings, etc. shall be demolished and removed first.

4.3 Blasting Demolition

- 4.3.1 In consideration of the operation condition of the surrounding environment, object to be demolished, building category and blasting scale, the blasting demolition can be divided into three grades – Grade A, B and C according to the national standard *Safety Provisions for Blasting (GB 6722)*. The relevant technical safety measures shall be in proper place. The safety assessment on the blasting demolition shall be executed and the relevant report shall be approved by the local relevant department before implementation.
- 4.3.2 The Contractor engaged in blasting demolition must possess the *Permit to Use Explosives* issued by the statutory department in the place where the project is located, and the said Permit shall match with the specific grade of the blasting demolition works. The design personnel of blasting demolition shall own the certificate to undertake the scope and relevant grade of blasting

demolition operation. The operators engaged in the blasting demolition shall work with the post certificate.

- 4.3.3 The explosive materials must be purchased at the designated supply centers after the Explosive Purchasing Permit is applied with the statutory department of the place where the project is located. Any kind of giveaway, transfer, reselling and re-lending of blasting materials shall be strictly prohibited.
- 4.3.4 For transport of explosive materials, the Explosive Transportation Permit must be applied with the statutory department in the place where the project is located, where special escort personnel shall be assigned for escort to ensure the equipment/materials to transport as per the designated route.
- 4.3.5 The temporary storage position of explosive materials must be approved by the local statutory department. It is strictly forbidden to store the articles irrelevant to explosive materials in the same room.
- 4.3.6 The safety and stability of the building shall be ensured during the preliminary demolition work, in which the mechanical and manual methods can be employed to demolish and remove the non-bearing wall or the components that does not affect the structural stability.
- 4.3.7 When the directional blasting demolition is used for the structures such as stack and water tower, the design of the blasting demolition shall take into account the touchdown vibration in case of building collapse. If necessary, the buffer material should be laid within the collapse scope or the vibration-proof ditch be excavated therein.
- 4.3.8 In order to protect the safety of the adjacent buildings and facilities, the blasting vibration strengthen shall be in accordance with the relevant provisions as specified in the current national standard *Safety Provisions for Blasting (GB 6722)*. In case of blasting demolition of building foundations, the explosives dose used at one time shall be limited.
- 4.3.9 During the blasting demolition, the blasting positions shall be covered and sheltered, and the covering material and sheltering facilities shall be firm and reliable.
- 4.3.10 The electric blasting circuit and the non-electric detonator blasting network shall be adopted in the blasting demolition. The resistance of the blasting circuit and power of blasting power supply shall meet the design requirements. The blasting of non-electric detonator shall apply double crossover closed networks. The blasting demolition shall not use detonating cord circuit or detonating fuse for blasting.

Before charging, the explosive materials shall undergo performance test. Blasting test and the blasting circuit simulation test shall be conducted in a safe place.

- 4.3.11 To implement the blasting demolition, the blasting command post shall be set up under the

leadership of the relevant department in the place where the project is located. The warning line shall be set out in accordance with the safe distance determined in the Construction Management Plan.

- 4.3.12 The blasting demolition shall be implemented in accordance with the requirements in Section 4.3 of this Code, and in compliance with the provisions as laid out in the current national standard *Safety Provisions for Blasting (GB 6722)*.

4.4 Static Crushing

- 4.4.1 When the building foundation or partial block is to be demolished and removed, the static crushing method shall be adopted.
- 4.4.2 When the corrosive static crushing agent is used in operation, the agent injection personnel must wear protective gloves and protective glasses. After injecting the crushing agent in the holes, the operation personnel shall keep a safe distance and be strictly prohibited from walking within the injected hole area.
- 4.4.3 Static crushing agent shall not be mixed with other materials during storage.
- 4.4.4 Between the adjacent two holes, the simultaneous operation of drilling and crushing agent injection shall be strictly prohibited.
- 4.4.5 During the static crushing, in case of an abnormal situation, the operation must be stopped. The work can only be resumed after the cause is identified and the corresponding measures are in place.

4.5 Safety Protective measures

- 4.5.1 The scaffolds and safety nets used in demolishing and removing must be set up by professional personnel in accordance with the design scheme. They can be only put into service after being accepted by the relevant personnel. During the horizontal operation, the operators shall keep a safe distance.
- 4.5.2 The safety protection facilities shall be inspected by item and category, with the acceptance check record documented.
- 4.5.3 The operators must be provided with proper PPE and know how to use them correctly.
- 4.5.4 The Contractor must, in accordance with the Safety Construction Management Plan for demolishing and removing works or Safe Work Method Statement, define the hazardous zone within the jobsite and set out the warning line and the relevant safety signs, for which the designated person(s) shall be assigned for supervision.

4.5.5 The Contractor must implement fire safety accountability system and establish the obligatory fire protection organization with responsible person(s) defined for the routine fire safety management of the jobsite.

5 Safety Technology Management

- 5.0.1 Before commencement of the demolishing and removing works, the Construction Management Plan or Safe Work Method Statement shall be developed in line with the project characteristics, structural conditions, work quantities, etc., which shall be implemented after being signed and approved by the technical responsible person and the chief supervision engineer. During the work process, any change if necessary shall be approved by the original approval person before implementation.
- 5.0.2 In severe weather conditions, the demolishing and removing operation shall be strictly prohibited.
- 5.0.3 On the day when the demolishing and removing operation is completed, all mechanical equipment shall be kept away from the demolished and removed building(s). The temporary facilities during the work shall be kept away from the demolished and removed building(s) at a safe distance.
- 5.0.4 The relevant working personnel shall be subject to relevant procedures and sign the labor contract. They shall receive safety training and pass the examinational before taking the job.
- 5.0.5 Before carrying out the demolishing and removing works, the operation workers must be briefed in written form on the safety techniques.
- 5.0.6 The safety technical file must be established for the demolishing and removing works, including the following items:
- 1 Construction contract and safety management agreement for the demolishing and removing works;
 - 2 Safe Construction Management Plan or Safe Work Method Statement for the demolishing and removing works;
 - 3 Safety technical disclosure;
 - 4 Inspection and acceptance records for scaffolds and safety protection facilities;
 - 5 Labor contract and safety management agreement;
 - 6 Mechanical lease contract and safety management agreement.
- 5.0.7 The temporary power use at the jobsite must be implemented in accordance with the current national standard *Technical Code for Safety of Temporary Electrification on Jobsite* (JGJ 46);
- 5.0.8 During the work process of the demolishing and removing works, when significant risk or safety accident occurs, the emergency response plan shall be activated immediately, with efforts made to eliminate the dangerous condition, organize rescue, protect the accident site, and report the

relevant departments.

6 Housekeeping Management

- 6.0.1 The vehicles transporting refuse and dregs shall be enclosed or covered, and designated person shall be arranged for commanding during incoming/outgoing to/from the site. The operation time for transporting refuse and dregs shall comply with the relevant provisions of the place where the project is located.
- 6.0.2 For underground pipes and lines, obvious marks shall be provided on the ground by the Contractor. The protective measures shall be taken for the inspection wells and hold wells for water, electricity and gas.
- 6.0.3 During the process of the demolishing and removing works, the measures for flying dust prevention and noise mitigation shall be in place.
- 6.0.4 After the completion of the demolishing and removing works, the refuse and dregs shall be removed from the site in time.
- 6.0.5 The improved hot work management system shall be established for the jobsite. The hot work approval procedures must be performed for any hot work, and the hot work permit must be on hand before the commencement of the hot work at the designated time and place. The designated person(s) shall be assigned for monitoring throughout the work process. The relevant personnel must confirm and ensure that there is no fire hazard before leaving the job site.
- 6.0.6 In the event that the flammable, combustible substances and insulation material are present during demolishing/removing of buildings, open flame operation is strongly prohibited.

Explanation of Wording in This Code

- 1 Words denoting the different degrees of strictness are explained as follows in order that they can be distinguished each other during the implementation of this Code:
 - 1) Words denoting a very strict or a mandatory requirement:

“must” is used for affirmation; and “strictly prohibit” is used for negation;
 - 2) Words denoting a strict requirement under normal conditions:

“shall” is used for affirmation;

“shall not” is used for negation;
 - 3) Words denoting a permission of slight choice or an indication of the first choice when conditions allow:

“should ”or “may” is used for affirmation;

“should not” is used for negation;

“may” is used for a permission of choice under certain conditions.
- 2 “Be in accordance with” or “be in compliance with” are used in the text of this Code for those items that refer to the related standards, codes or regulations as a must requirement to implement this Code.