

TERNOPIL IVAN PULUY NATIONAL TECHNICAL UNIVERSITY

**TEKİN ERDAL**

UDC 624.012

**PROJECT OF BUILDING A RESTAURANT IN KIEV TO STUDY THE  
FOUNDATION**

192 "Construction and Civil Engineering"

**Abstract**

diploma work for the degree of master's degree

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The work was performed at the Department of Structural Mechanics of Ivan Puliuy Ternopil National Technical University

**Head of work:** k.t.s., Ass. prof. **Ihnatieva Victoria**, Ternopil Ivan Puluj National Technical University, assistant professor of building s construction

**Reviewer:** d.t.s., prof. Pidhursky M.I

Protection will be held 28 December 2019 y. at 10<sup>00</sup> pm at the meeting №7 examination board in Ternopil Ivan Puluj National Technical University by the address: 46001, Ternopil, str. Ruska, 56, educational building № 2, room 35

Secretary of the Examination Committee No. 7 \_\_\_\_\_ Pidhursky I.M.

## GENERAL CHARACTERISTICS OF THE WORK

The global stiffness matrix for all structures is constructed in a default and displacements are performed by blocking technique. Taking into account the infinite stiffness of the plates in the floor plane in the horizontal plane, 6 freed concrete structures are not related to the fundamental stiffness matrix, for the displacements  $\ddot{e}_x, \ddot{e}_y, \ddot{e}_z$  in the plane of the floor, there are 3 unknowns for the displacements, and for the displacement of the element ends  $\acute{e}_x, \acute{e}_y, \acute{e}_z$ , all 3 unknowns. . Shear deformations of tie and column elements and torsion elements are taken into consideration. Equation set; The endpoint numbering is arranged in such a way that the program can solve the minimum memory with the point optimization of the program side for the solution to be fast. Structure + foundation can be solved together and basic stiffness matrices are constructed with winkler hypothesis.

Considerations in the global stiffness matrix:

The sections of beams in columns and walls, infinitely rigid load and stiffness matrix arrangement.

Flexible recessed solution of beams stuck in the weak curtains in wide curtains.

Consideration of shear deformations in beams stuck in the direction of stiffness in wide curtains.

Considering the axial load eccentricity in the stiffness matrix in the column with the deflection of the column and static axes.

Dynamic analysis; CQC (Complete Quadratic Combination) method to find the forces according to 5% damping percentage.

### STATIC ANALYSIS LOAD COMBINATION NOTATIONS:

$G + G + G + G + G$	:	General dead load
$Q + Q + Q + Q + Q$	:	1. General moving load
$Q + o + Q + o + Q$	:	2. Moving load
$o + Q + o + Q + o$	:	3. Moving load
$Q + Q + o + Q + Q$	:	4. Moving load
$o + Q + Q + o + Q$	:	5. Moving load
$Q + o + Q + Q + o$	:	6. Moving load
$S_z$	:	Horizontal ground thrust
$E_x + 5\% x e_y$	:	X direction earthquake + 5% eccentricity
$E_x - 5\% x e_y$	:	X direction earthquake - 5% eccentricity
$O + 5\% x e_x$	:	Y direction earthquake + 5% eccentricity
$O - 5\% x e_x$	:	Y direction earthquake - 5% eccentricity
$W_x$	:	X direction wind
$W_y$	:	Y direction wind
$T$	:	Heat load

Standards used in the program:

Implementing Regulation on Structures to be Constructed in Disaster Regions  
TS-498 mobile and wind load standard.

TS-500 is the calculation standard of reinforced concrete structures.  
 ACI-318, UBC-97 code  
 EUROCODE-2,8 code  
 SNIP-2.03.01 code

## MAIN CONTENT OF THE WORK

**The introduction** analyzes the feasibility of developing a project for the construction of multi- PROJECT OF BUILDING A RESTAURANT in frame and monolithic execution .

**In the first section «Architectural and construction»** the analysis of climatic conditions and engineering-geological elements on the site of construction was performed , the three-dimensional planning solution of the building was offered , the thermal engineering calculation of the enclosing structures was carried out, the engineering support of the building was proposed .

**In the second section «Design Structural»**, the load on the building and its individual elements are identified . The building in the SCAD 11.3 settlement complex has been changed . The reinforcement of the floor slab was selected, the calculations of the slab along the normal section, the reinforcement on the support, the strength of the slab for punching were carried out. Column reinforcement was selected, effort was calculated in the column of the basement floor . Stair marches were constructed and calculated.

**In the third section. «Science and Research»** Section rovedeno systematic analysis and comparison of types of foundations for a multi-storey building on a site with a gradient .

According to the results of the research, it is concluded that of all modern types of foundations, the helical screw has the greatest versatility at an affordable cost. However, given the geological conditions of the site of construction ivnytstva was selected in the type of foundation - monolithic slab that mercy yno protect against seasonal puchi n ing loamy soils.

**In the fourth section «Technology and organization of building production»** are characteristic conditions of construction and at AIN parameters of the building. Rozroble no technological map for the construction of one floor reinforced concrete monolithic frame building with a flat ceiling.

**In the fifth section «Justification of economic efficiency»** the substantiation of economic efficiency for the construction of Project of building a restaurant in kiev to study the foundation. Local, summary and object estimates for individual types of work were obtained.

**In the sixth section «Special part»**, a comparison of a monolithic frame with crossbars in two directions and a monolithic overlap, columns with a cross section of 400 × 400 mm monolithic; prefabricated frame ( bezrigelny ), with overlapping of precast concrete, monolithic frame with monolithic overlapping, columns with section 250x900 mm, 750x250 mm, 1350x250 mm monolithic. It is established that the most rational in this case is the arrangement of a monolithic frame with a monolithic overlap, columns with section 250x900 mm, 750x250 mm, 1350x250 mm monolithic.

**In camping at momu section «Occupational health and safety in emergency situations»** to consider at law of Ukraine on labor protection, safety issues of construction work in the development of pits in the process of loading and unloading, the electric welding works when performing concrete work. Resistance of a dwelling house to impact of a shock wave of a nuclear explosion is estimated. Measures have been developed to protect the occupants of the house from the consequences of emergencies.

**In the eighth th the «Environment»** P ozhlyanuto main areas of ecological construction. The role of energy saving in solving environmental problems is considered.

## GENERAL CONCLUSIONS

1. Developed by volume -planuvalni and architectural designs .
2. The geological analysis of the construction area is performed. The calculation and zakonstruyovano main supporting structures.
3. The analysis and technical and economical comparison of the types of foundations for multi-storeyed construction on a slope plot are made .
4. The types and volumes of the main construction works are determined. The technological map for the foundation plate arrangement, the calendar schedule of execution of construction and assembly works, the construction plan have been developed .
5. It is established that of all modern types of foundations, the pale- screw screw has the greatest versatility at an affordable cost. Given the geological conditions of a given type of construction chosen foundation - monolithic slab, which mercy yno protect against seasonal puchi n ing loamy soils.
6. Measures have been developed concerning the safety, stability of the building to the shock wave and protection of the occupants of the building from the consequences of emergencies.
7. Increasing the economic efficiency of the objects in the production stage and their studies on the economy are indicated.
8. The role of energy saving in solving environmental problems has been established.

## LIST OF PUBLISHED WORKS

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2. Tekin E. State of the problem of strengthening reinforced concrete structures / E.Tekin // Actual problems of modern technologies: book of abstracts of the IV International scientific and technical conference of young researchers and students, November 27-28, 2019, Ternopil. - Ternopil: TNTU, 2019. - P. 13-14. Access mode: [http://m.tntu.edu.ua/storage/news/00003921/Book%201\\_2019.pdf](http://m.tntu.edu.ua/storage/news/00003921/Book%201_2019.pdf)

## MAIN LITERATURE DATA USED IN PERFORMANCE

1. *Construction Climatology: DSTU-N B B.1.1-27-2010 (Effective 2011-01-11) - K .: Ministry of Construction of Ukraine, 2011-123 p. (National Standards of Ukraine) .*
2. Loads and Impacts: DBN B.1.2-2: 2006 (Effective 2007-01-01) - K .: Ministry of Construction of Ukraine, 2006-59 pp. - (National Standards of Ukraine).
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8. Concrete and Reinforced Concrete Structures: DBN B.2.6-98: 2009-K: Ministry of Construction of Ukraine, 2009. - 92 p .- (National Standards of Ukraine).
9. Babich EM, Babich VE, Savitsky VV Calculation of non-continuous reinforced concrete beams using deformation model: Recommendations. - Rivne: Publishing House of the National University of Water Management and Nature Management, 2005. - 37c.

## ANNOTATION

**Tekin Erdal. Project of building a restaurant in kiev to study the foundation.** - Diploma work for the degree of master's degree in specialty 192 "Civil Engineering and Civil Engineering". Ternopil Ivan Pulyuy National Technical University named, 2019.

In the difficult work, the project of an Project of building a restaurant in kiev to study the foundation. The three-dimensional planning and engineering and design solutions are proposed. A durable calculation of basic load-bearing structures. The thermotechnical calculation of the nails of the enclosing structures was performed. The technological map for erection of one floor of a reinforced concrete monolithic frame of a building with a flat floor, a calendar schedule, a construction master plan is developed. Analysis performed and so Yeghnik-economic comparison of the types of foundations for a multi-storey building on a site with a gradient. The measures on labor protection, resilience building to shock and protect the inhabitants of the house of emergencies. The role of energy saving in solving environmental problems has been established.

Key and the words: Frame - monolithic house, load bearing structures, foundations.