

# OPINION

**of scientific works and educational activities of  
ch. Assistant Professor Stanislav Tsvetkov, PhD,  
presented for participation in the competition for the academic position  
"Associate Professor" in the professional field 5.7. Architecture, construction and  
geodesy in the scientific specialty "Building Structures", announced in State  
newspaper No. 15 of 19.02.2021 for the needs of VSU "Lyuben Karavelov"**

by Assoc. Prof. Dr. Eng. Anita Handruleva  
professional field 5.7. Architecture, construction and geodesy,  
with registration in NACID

The current opinion has been prepared on the basis of documents submitted for participation in the competition announced by VSU "Lyuben Karavelov" (State newspaper, issue 15 of 19.02.2021) and on the website of the higher school for the needs of Department "Building Structures" to the Faculty of Civil Engineering. The submitted documents by the competition meet the requirements of the Academic Staff Development Act in the Republic of Bulgaria, Regulations for implementation of the Academic Staff Development Act in the Republic of Bulgaria and Regulations for the development of the academic staff at the Higher School of Civil Engineering "Lyuben Karavelov" - Sofia . The competition procedure has been followed.

## **1. General presentation of the received materials**

For participation in the competition announced are filed documents only of candidate Ch. Assistant Professor Dr. Eng. Stanislav Tsvetkov, Lecturer in the Department "Building Structures", Faculty of Civil Engineering, Higher School of Civil Engineering "Lyuben Karavelov".

For participation in the competition, candidate Dr. Tsvetkov presented a list of: 25 publications; 2 monographs; list of citations and monograph.

Publications for participation in the competition for "chief assistant" attached to in Folder № 1.

Require materials for participation in the competition for "Associate Professor", systematized as follows:

- Dissertation work for awarding a educational and scientific degree doctoral degree (Folder № 2: Group of indicators A, publication 1.1. - abstract + publications №№ A.1.-1 ÷ A.1.-13);
- Habilitation work (Group of indicators B, publication 3.1. - monographic work);
- Monographic work (Group of indicators D, publication 5.1.);
- Summaries of publications - (Folder № 3);
- Scientific publications in editions that are referenced and indexed in a world-famous database of scientific information (Folder № 4: Group of indicators D, publication 7.1.);
- Scientific publications in unreferenced journals with scientific reviewing or in edited collective volumes (Folder № 5: Group of indicators D, publications №№ 8.1. ÷ 8.24.);
- Description of citations (Folder № 6);
- Citation in scientific journals, referenced and indexed in world-famous databases with scientific information or collective volumes (Folder № 7: Group of indicators E, publications №№ 12.1. ÷ 12.8.);
- Citations in monographs and collective volumes with scientific reviewing (Folder № 8: Group of indicators E, publications №№ 13.1. ÷ 13.45.);

- List of participation in educational research projects and published university textbooks used in the school network (Folder № 9);
- Learning projects, programs, tasks and summaries (Folder № 10);
- Certificates, references, diplomas (Folder № 11);
- Author's reference (self-assessment report) for: study employment, scientific and scientific-applied contributions (Folder № 12).

All submitted titles are accepted for reviewing.

The submitted materials meet the requirements of Law for development of the academic staff in the Republic of Bulgaria, as well as the Regulations of its application, and they exceed the minimum national requirements according to Art. 2b, para. 2 and 3, respectively to the requirements under Art. 1a, para. 1 of Regulations for application of the Law for development of the academic staff in the Republic of Bulgaria.

## **2. Brief information about the candidate**

Stanislav Petrov Tsvetkov was born on September 12, 1984 in the town of Pernik. In 2009 and 2011 he consistently graduated with a bachelor's degree and a master's degree from VSU "L. Karavelov" in the specialty "Construction of buildings and facilities" and specialization "Building constructions". In 2018, defends of a doctoral dissertation on "Antiseismic provision of special reinforced concrete structures" at VSU.

From 2010 to 2014 he was a regular assistant at the Department "Building Structures" at "L. Karavelov". Since 2014 until 2019 he is a part-time assistant and from 2019 until now he is a chief assistant at the department. Conducts consultations, corrections and lecture courses in a number of constructive disciplines.

He uses English and Russian in his work.

Ch. Assistant Professor Stanislav Tsvetkov, PhD, uses specialized software for construction design: Gala Reinforcement; Design expert; Tower; SAP2000; ANSYS; CIVIL FEM. Works with AutoCAD. Works with MS OFFICE: WORD; EXCEL; OUTLOOK.

## **3. General characteristics and evaluation of the scientific production of the candidate**

Dr. Eng. Stanislav Tsvetkov presents 28 scientific publications for consideration through a competition. Of them: main habilitation work - monograph; two other monographs and 25 publications, the candidate being the sole author of two of the monographs. The publications are scientific reports and articles in Bulgarian and foreign scientific editions and collections of scientific forums.

The publications are divided as follows:

- according to the language: in Bulgarian - 27 and in English - 1;
- comparison of the number of authors / co-authors: with one author - 10; with two co-authors - 17 and with three co-authors - 1.

Of the presented papers 1 has been published in indexed international editions.

The scientific publications of Ch. Assistant Stanislav Tsvetkov, PhD, reflect his scientific interests in the field of computer modeling and simulation in the analysis of building structures and construction of reinforced concrete structures.

The main habilitation work (monograph) – "Reinforced concrete structural shear walls - antiseismic "discs" is an end of the study, with scientific and scientifically applied nature, on the problems for designing of monolithic reinforced concrete walls, taking seismic impacts. In this study the author's goal is analysis of the special matters of constructions covered in a wide ranges and their details such as: kinds variety, ways of analysis and

construction. In the book with commented horizontal reversible loads - wind and earthquake, and shown are the main differences between them. Briefly are shown some technological operations accompanying the construction of wall structures. A historical overview has been made concerning the stages of development of science and practice. The species diversity of structural elements is shown. Considered are with the help of theoretical information for the design of reinforced concrete walls and mixed structural systems, absorbing seismic impacts, in accordance with modern Design Standards - Eurocodes. Innovations in antiseismic design and construction are shown. The decision for a reinforced concrete washer is commented according to Ordinance № RD-02-20-2 / 2012 for the design of buildings and facilities in earthquake areas. Author's solutions are shown: by further development of some theories (and postulates) and original ones. Also shown are: fragments of: diploma projects developed under the guidance of the author, as well as scientific conference papers. The included solutions with specialized software are an additional segment throughout the book, needed today. Some of the world's most popular antiseismic systems are shown, through which the monolithic structures can be preserved during and after an earthquake. The materials can be used in the course and diploma design by students of VSU "Lyuben Karavelov", by students from other universities, as well as by: doctoral students, architects and civil engineers from practice.

The monograph contains 398 pages (with front and back covers; feuilletton; introduction; main text and literature), with: figures - total number: 287; tables - total number: 72; formulas total number: 93. 116 literature sources are cited.

**“Constructors for civil engineers - prefabricated one-storey buildings of reinforced concrete elements”** (*Published monograph, which is not presented as a major habilitation work*): the monograph is an end of analysis with scientific and applied nature for the problems for the design of prefabricated single-storey reinforced concrete buildings. The purpose of the development is in a wide range to cover the special matters of constructions of prefabricated elements, as well as at the theirs: details, connections and joints, such as: high diversity, the ways of analysis and construction. Basic theoretical data for the design of reinforced concrete structures, including the seismic impact, are considered. As elements in the building are commented: wall sandwich panels; roofing steel LT-sheets; prefabricated floor and roof panels (trough-shaped / ribbed, double T-panel and panel hollow); prefabricated roof beams; beams with reduced footing; the rafters of frame structures: full-wall beams and lattice beams (Virendel's beams and trusses), as well as the arches; shell and prismatic roof structures; crane beams; prefabricated columns without / with crane console or tuning forks, Virendel's columns and columns with complex (in plan) cross section; the foundation structures (single prefabricated cup-shaped foundations, foundations with high cups, machine foundations, monolithic strip foundations connecting foundation beams and sanded reinforced concrete floors). In the analyzes of building structures are considered: deformation joints and vertical strengthening links, as well as examples by hand and with specialized software of planar and spatial models. The impacts of: snow, wind, earthquake and crane equipment have been clarified. Innovations in antiseismic design are shown. The decision for frame construction, according to NPSSZR-2012 is commented. A commentary-reflection on the present and the future of elements is shown, in comparison with the recent past. Solutions are shown: by further developing some theories and original ones. Also shown are: fragments of diploma projects developed under the guidance of the author, analyzed projects from the visits and company catalogs with assortments. The materials can be used in the course and diploma design by students of VSU "Lyuben Karavelov", by students from other universities, as well as by: doctoral students, architects and civil engineers from practice. The included solutions with specialized software are an additional

segment throughout the book, needed in our time. Ways to restore and strengthen building structures are shown, as well as some of the world's most popular antiseismic systems, through which prefabricated structures can be preserved during and after an earthquake.

The monograph contains 388 pages (with front cover and feuilletton; introduction; main text and application), with: figures - total number: 288; tables - total number: 89; formulas total number: 596. 103 literature sources are cited.

Are fulfilled the minimum national requirements to the Regulations for application of the Law for development of the academic staff in the Republic of Bulgaria for field 5. Technical sciences, as follows:

|                             | Group of indicators | Contents                             | Minimum number of points required | Performed by the candidate |
|-----------------------------|---------------------|--------------------------------------|-----------------------------------|----------------------------|
| <b>Mandatory:</b>           | <b>A</b>            | Content 1                            | 50                                | <b>50</b>                  |
|                             | <b>B</b>            | Content 3                            | 100                               | <b>100</b>                 |
|                             | <b>Г</b>            | Sum of indicators from 5 to 11       | 200                               | <b>376,67</b>              |
|                             | <b>Д</b>            | Sum of indicators from 12 to 15      | 50                                | <b>221</b>                 |
| <b>Additional–optional:</b> | <b>E</b>            | Sum of indicators from 16 to the end | -                                 | <b>30</b>                  |
| <b>Total:</b>               |                     |                                      | 400                               | <b>777,67</b>              |

According to the descriptions and the list of noticed citations, it can be seen that the works of the candidate are recognizable.

#### **4. Characteristics and assessment of the candidate's educational activity**

##### **4.1. Administrative and organizational activities**

From February 2016 to October 2017, Dr. Eng. Tsvetkov was a laboratory specialist at the "Laboratory for numerical experiments and analysis of building structures" - a laboratory at the Department "Building Structures" of Faculty of Civil Engineering of VSU. Several scientific reports and research diploma projects have been prepared in the laboratory.

From January 2017 to February 2017, Dr. Eng. Tsvetkov was on temporarily held the position of Head of Training Department - for preparing schedules of classes for full-time and part-time education, the schedule of exams, preparation of a candidate-student campaign, etc.

Since 2016, Dr. Eng. Tsvetkov has been an Academic Mentor for over 50 students from Faculty of Civil Engineering and Faculty of Architecture of VSU, under the program "Student Internships" of the Ministry of Education and Science.

In 2019, Dr. Eng. Tsvetkov is a technical editor of course design guides on: "Industrial buildings I" (ISBN: 978-954-331-101-9 - book;

ISBN: 978-954-331-102-6 - e-book) and "Industrial buildings II" (ISBN: 978-954-331-105-7 - book; ISBN: 978-954-331-104-0 - e - Book), for architects.

Dr. Eng. Tsvetkov. is a member of the Organizing Committee of the XX International Scientific Conference VSU'2020.

From March 2021. until 03.2025 Dr. Eng. Tsvetkov was elected Secretary of the Academic Council of VSU.

#### **4.2. Educational and pedagogical activity**

Ch. Assistant Professor Dr. Eng. Tsvetkov participates actively in the educational activities as a lecturer in the Department of Building Structures, Faculty of Civil Engineering at VSU "Lyuben Karavelov" in the period from 2010 to 2021.

The presented author's reference shows a variety of disciplines led by the candidate - constructions of buildings and facilities, modeling, etc., including: course and diploma design of students - consultations and corrections; lectures on: Reinforced concrete structures, Masonry structures, Restoration and reinforcement of reinforced concrete structures / building structures, Modern computer calculation methods in building design / Computer methods for designing building structures, Automation at building design / Modeling of building structures, etc.

WEB is presented - a course on "Special reinforced concrete structures" (for the master's degree Building Contructions); Part "Design of a beamless slab" - explanations (auxiliary materials and video "step by step" for static solutions) - for bachelor's degree; step-by-step videos for a 3D-modeling static-dynamic model on Reinforced Concrete Structures and Modeling of Building Structures (for master's degree).

According to the submitted reference, the classroom and extracurricular activities of the candidate is determined above the norm. He is the diploma supervisor and consultant of 82 diplomas (diplom theses) in the specialty "Construction of buildings and facilities", 25 diplomas in the specialty "Construction and architecture of buildings and facilities" and 47 diplomas in the specialty "Construction of buildings and facilities" with specialization "Building constructions". He is a reviewer of over 20 diploma projects.

He was held consultations for students majoring in Architecture.

From January 2020 until now Dr. Eng. Tsvetkov is a lecturer at the Center for Vocational Training at VSU "L. Karavelov" - Sofia.

#### **5. Characteristics and evaluation of the research activity of the candidate**

In connection with his research, Dr. Stanislav Tsvetkov is involved in four research projects and scientific and applied research. There is information is known about the application of methodologies from the doctoral dissertation and guidelines for the design of special reinforced concrete structures in an investment project in Bulgaria.

#### **6. Scientific and scientific-applied contributions of the candidate**

I accept presented scientific and scientific-applied contributions.

Indicator group B, publication 3.1. (monographic work)

1. Classification of the walls by shape is made;
2. Systematized and discussed information about different types of structural walls - analysis and construction;
3. Basic researches in the field for computer modeling (simulations by the Finite element method) on constructive elements - frame and wall models are shown;
4. Research has been carried out (with further development of the types of numerical models) for the stability of the solid walls and walls with holes - obtaining internal forces and bearing capacity;
5. The walls (solid and with openings) with different stiffness in height (levels) are analyzed;
6. Have been found values of the multiplication factor for the shear force (at the DCH level), at different parameters of the formula. A proposed is for a DCH design level to use the existing reinforcement as "active" in the formula and not to look for new, additional ones;
7. Interaction diagrams for  $\Pi$ -shaped nuclei are composed;
8. Connecting beams of different geometries are analyzed, and a correction in the

formula for determining the area of the reinforcement is proposed, as well as the application of truss structures;

9. Parametric studies for:

9.1. Checks for regularity in the plan and twisting-deformable system (by hand and with a software product) - with compared methodologies;

9.2. Dynamic "stabilization" of the building with control over its shapes and periods of oscillation - the relationship between structural and architectural design;

9.3. Analyses of buildings with different storeys and distributions - influencing of the materials and geometries on the values to internal forces.

10. Ways and means for control of horizontal reversible impacts on buildings are commented, showing a variant study through numerical experiments on a building (control of the period and shape of the oscillations), by constructing links;

11. NPSSZR-2012 is commented, showing a methodology (step-by-step solution) for analysis of a reinforced concrete washer (with given dimensioning procedures under NPBSK-88);

12. Materials (fragments of scientific reports and diploma theses) are shown, with the participation of students from the specialties "Construction of buildings and facilities" and "Construction and architecture of buildings and facilities", characterized by originality, with a leading lecturer of the author.

### **"Constructors for civil engineers - the prefabricated one-storey buildings from reinforced concrete elements":**

Indicator group D, publication 5.1. (monographic work)

1. Systematized is the information about the different types of prefabricated reinforced concrete structures (analysis and production) in one place, as well as some theoretical information about: earthquake and behavior factor, computer analysis (comparison between different software products for different ideas);

2. It is made reasoning on the analysis of structures (by applying the of calculation procedures) in the light of Eurocodes, which is part of the new knowledge of Bulgarian design practice, further developing the procedures for analysis of structural elements, with additional guidelines for: columns with tuning forks and crane beams;

3. A methodical (step-by-step) decision has been made, according to the Ordinance of 2012 for the design of buildings and facilities in earthquake areas with analysis of reinforced concrete prefabricated (frame) structure.

4. A critical analysis of the types of structural elements in terms of applicability and degree of efficiency has been performed.

Publications on indicators G7 and G8, as follows:

| <i>publication</i> | <i>scientific contribution</i>   |
|--------------------|--|
| <b>7.1.</b>        | The separation of the level between the basement and the ground floor has been proven, which plays an important role in the stiffness and deformability of the structure as a whole and is a limit for the location of the critical areas. |
| <b>8.1.</b>        | The procedure has been further developed and implemented in the Methodological Guide for a course project in Reinforced Concrete Structures, Wall Structures.  |
| <b>8.2.</b>        | The values and extremes in internal forces along the heights of the walls, by parameterizing the types of buildings, are observable.   |
| <b>8.3.</b>        | The extreme stresses have been established, at different schemes and levels of filling, and concentration zones have been established, for pressure  |

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|              | directions have been presented.   |
| <b>8.4.</b>  | Decisions by design documents with different postulates and methodologies are compared, and the peak values of the internal forces from product storage are observed.   |
| <b>8.5.</b>  | Problems with reinforcing of slabs and the need for additional reinforcement to ensure prevention of structures in punching shear where early de-formworking is applied have been checked.  |
| <b>8.6.</b>  | The impacts on the tanks have been checked, with a special idea for the method of analysis for this type of facilities.   |
| <b>8.7.</b>  | The applied task for solving such facilities is to study the types of impacts and ways of application - on static schemes.  |
| <b>8.8.</b>  | A decision-expertise of a classic type of cooling tower - facility has been made, in which requirements for the Eurocodes have been observed.   |
| <b>8.9.</b>  | It has been proven that in the construction of fruit storage buildings must work together civil engineers, architects and technologists to make the buildings effectively designed.   |
| <b>8.10.</b> | A "connector" is proposed, which also performs a reinforcing function, because in transitions in different cross sections, the reinforcement is in danger of intertwining and / or dislocation, especially when the areas have different number of reinforcements (and diameter).   |
| <b>8.11.</b> | The author's decision is based on a study, including requirements for Eurocodes (for modeling and design) and it has been proven that the frame construction is typical and suitable for church buildings.  |
| <b>8.12.</b> | The thesis is proved that the construction of buildings for furniture enterprises has been collaborated between civil engineers, architects and technologists to make the buildings effectively designed.   |
| <b>8.13.</b> | The research and the author's solution include innovative thinking combined with the idea of spatial design.  |
| <b>8.14.</b> | The thesis is proved that the construction of buildings for multi-storey car parks and garages has been collaborated between civil engineers and architects to make the buildings effectively designed.   |
| <b>8.15.</b> | The decision shows that analysis of building with self-supporting sheet metal is easy and can be done both with various specialized software and by hand. A detailing is of particular importance.  |
| <b>8.16.</b> | It is shown that the real levels of filling and the modes of operation of the bunkers compound logical combinatorics for applying the loads on them.  |
| <b>8.17.</b> | Through the shown solution (new design) of a lighthouse with a unique shape, performing different functions, its suitability is established by a suitable way for analysis and construction.  |
| <b>8.18.</b> | The task of determining effective widths is a multifaceted study (with validation of data and derivation of new data), in which matters the ways to construct reinforcement bars in the beams.  |
| <b>8.19.</b> | It is proposed to check (on a water column) to determine the so-called "Fuss" bearing reinforcement bars from the skeleton of meridional reinforcement, absorbing a overturning moment from the hydrodynamic action of water. It is proved that the facility is economically constructed and is suitable not only for industrial needs. |
| <b>8.20.</b> | The solution is a new design project of a water tower (with a frame supporting structure), its suitability is established by a suitable way for analysis with checks and construction, in accordance with the Eurocodes.  |

|              |   |
|--------------|---|
| <b>8.21.</b> | The location of the critical zone along the height of the walls has been studied (parametrically) - solid walls and with centrally constructed openings, which is important for the seismic analysis, as it affects the values of the internal forces.  |
| <b>8.22.</b> | The location of the critical zone along the height of the walls has been studied (parametrically) - with centrally and asymmetrically constructed openings, which is important for seismic analysis, as it affects the values of internal forces. The connecting beams are checked, because are responsible elements and the interpretation of their results is important for determining their reinforcements. |
| <b>8.23.</b> | In terms of construction, a reinforced concrete bio-basin has been designed, which is a complex structure with intersecting walls and when using "hidden columns" with a complex shape. Between these vertical elements, symmetrically reinforced vertical walls (stems) are formed.  |
| <b>8.24.</b> | In terms of construction, a reinforced concrete radial precipitator has been designed, representing a structure with a cylindrical wall and a conical bottom - with variable geometry and a central dry chamber, from where the peculiarities arise in construction of load-bearing reinforcement bars (overlaps and anchoring), and computer modeling are complicated.   |

## **6. Evaluation of the personal contribution of the candidate**

The monograph and ten of the scientific publications have been developed independently and contain significant scientific contributions. The other publications are co-authored and the most part, the candidate is the first author.

## **7. Personal impressions**

I know ch. Assistant Professor Dr. Eng. Stanislav Tsvetkov for more than 15 years. During this period I have repeatedly had the opportunity to be convinced of his ability to generate and implement new ideas, as well as his high professionalism in the field in which he works. My personal impressions were formed during our a joint work at VSU "Lyuben Karavelov". Ch. Assistant Professor Dr. Eng. Stanislav Tsvetkov has excellent theoretical training and extensive practical experience. Performs his duties conscientiously. There is a pedagogical approach when working with the students. He actively participates in organizing activities outside the educational process - scientific conference of VSU "Lyuben Karavelov", departmental events and administrative activities. He is no conflict person and maintains very good relations with his colleagues.

## **CONCLUSION**

The presented from Dr. Stanislav Tsvetkov materials for participation in the competition for the academic position of "Associate Professor" for teaching, research and scientific and applied activity prove, that are fully performed requirements for the Academic Staff Development Act in the Republic of Bulgaria, Regulations for implementation of the Academic Staff Development Act in the Republic of Bulgaria for the academic position for which he is applying.

After getting acquainted with the materials provided to me and scientific papers and analysis of the scientific and scientific and applied contributions contained in them, I give my **positive** assessment and **I recommend** to the Scientific Jury to propose to the Faculty Council of the Faculty of Civil Engineering at VSU "Lyuben Karavelov" to elect Dr. Eng. Stanislav



Tsvetkov to take the academic position of "Associate Professor" in the professional field 5.7. Architecture, construction and geodesy in the scientific specialty "Building Structures" (Reinforced concrete structures).

Sofia,  
04.06.2021

Reviewer: .....  
/ Assoc. Prof. Dr. Eng. An. Handruleva /