MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE KYIV NATIONAL UNIVERSITY OF CONSTRUCTION AND ARCHITECTURE



# Conference program and proceedings

INTERNATIONAL SCIENTIFIC-PRACTICAL CONFERENCE OF YOUNG SCIENTISTS KYIV UKRAINE 28.11-01.12

TIONAL ACTICAL ERENCE ENTISTS KYIV UKRAINE 28.11-01.12 2017 CLASS

**BUILD-MASTER-CLASS** 



MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE



KYIV NATIONAL UNIVERSITY OF CONSTRUCTION AND ARCHITECTURE



POLISH ACADEMY OF SCIENCES (KYIV OFFICE)

## WORKING PROGRAM AND PROCEEDINGS

INTERNATIONAL SCIENTIFIC – PRACTICAL CONFERENCE OF YOUNG SCIENTISTS

# «BUILD-MASTER-CLASS-2017»



28.11-01.12.2017 In Kyiv National University of Construction and Architecture

Ukraine, Kyiv, Povitroflotskyi av. 31

#### ORGANIZER OF THE CONFERENCE

#### KYIV NATIONAL UNIVERSITY OF CONSTRUCTION AND ARCHITECTURE

#### **CO-ORGANIZER OF THE CONFERENCE**

#### POLISH ACADEMY OF SCIENCES (KYIV OFFICE)

#### **CONFERENCE IS SUPPORTED BY:**

- Ministry of education and science of Ukraine;
- Ministry of regional development construction, housing and municipal economy Ukraine;
- All-Ukrainian Charitable Organization "Municipal Development Institute";
- Project of the Eighth Framework Programme of European Union on Research and Technology "Horizon 2020": «Train-to-NZEB: Building Knowledge Hubs»;
- Laboratories for research of energy efficiency problems in construction and architecture "Energy Center-KNUCA";
- Scientific and Educational Hub for Architectural Designing and Research of Nearly Zero Energy Buildings (NZEB) of Kyiv National University of Construction and Architecture

#### **CONFERENCE OBJECTIVE:**

Comprehensive exchange of experience in the design and construction, reconstruction and restoration of modern architecture objects. Dissemination and development of advanced computer-aided design technology and the practical aspects its implementation. Popularization of modern efficient materials, construction and technological equipment. Improving the qualification level of specialist of architectural and planning, design, construction, engineering and technical training program.

#### ORGANISING COMMITTEE:

Kulikov Petro (Chairman) Ploskyi Vitalii (Deputy Chairman) Pidlutskyi Vasyl (Scientific Secretary) Skochko Volodymyr (Head of working Committee) Mykhailovskyi Denis (Head of technical Committee)

Koliakova V. Andropova O. Berdnykh A. Kozhedub S. Bolharova N. Kukharuk A. Bondarenko O. Lavrukhina K. Mikhaleva M. Chepurna N. Chernenko A. Mishchuk D. Denysenko N. Mishchuk Y. Derevinskyi V. Piskunov S. Ivakhnenko I. Pochka K. Frolov A. Privmak O. Heher A. Pronevych Yu. Horelenko O. Prvimachenko O. Hubert Yu. Sakh R. Kashchenko T. Sakharov V. Klymchuk M. Shabala Ye. Kopasova H. Sharapa S.

Shkrobot M. Shkryl O. Shovkivska V. Shpakova H. Skochko L. Sobczuk H. Sobolevska L. Sukhanevych M. Tormosov R. Tsiutsiura M. Tsiutsiura S. Veksliarska T. Velychko S. Yehorov V. Yerukaiev A. Zolotar L.

#### THEMES OF SECTIONAL AND PLENARY MEETINGS

**Plenary meetings.** Energy saving and ecological concepts in the new architecture. System solutions in design and construction. Modern training and information projects of construction industry.

**Section 1. Architecture and Design**. Theory of Architecture. Architectural design of civil buildings. Design of Architectural Environment. Architectural design. Information technologies in architecture, computer-aided engineering and design of architectural objects. Technical aesthetics, applied geometry. Energy and resource saving in construction and architecture.

Section 2. Urban planning and land use planning. Urban planning and land use planning. Urban planning information systems and City planning cadastre. Urban Construction and Management. Improving the efficiency of urban construction. Landscape architecture. Cadastre and land monitoring. Engineering geodesy, geoinformatics and photogrammetry.

Section 3. Construction, materials and design technology of building production. Structural mechanics. Building designs, buildings and constructions. Foundation Engineering. Numerical modeling of building structures. Construction materials and products. Construction Technology of production. Standardization and certification in construction..

Section 4. Engineering systems, automated systems and environmental aspects of construction. Heat and gas supply. Ventilation systems of buildings and constructions. Water supply and sanitation. Use of water and thermal energy resources. Automated systems and measuring systems. Electronics and electrical engineering. Ecological problems in construction and architecture. Technical thermal physics and industrial heat power. Energy efficiency of construction objects.

Section 5. Construction vehicles and equipment. Machines for the production of building materials and structures. Machines for earthworks, road and forestry engineering work. Handling machinery. Building Machinery Services.

Section 6. Organization, economics and management in construction. Organization of building production. Commodity and commercial activities. Construction Economics. Management in construction and architecture.

**Section 7**. **Information Technology**. Computer science. Information Technology. Information technology in education. Project and Program Management. Computer networks. Cybersecurity.

Section 8. Historical, socio-cultural, political, legal and philosophical aspects of architecture and construction development. Social-political development of society. Physical education and sports in the conditions of building production. History of Ukrainian culture. Pedagogy, philosophy and psychology of relationships in construction. Legal relations in construction and architecture.

#### **CONFERENCE VENUE**

Kyiv, Kyiv National University of Construction and Architecture, Povitroflotskyi av. 31. Plenary meeting – Scientific Council Hall, aud. 466 Sectional meetings are specified during registration.

#### **CONFERENCE EXPOSITIONAL PROGRAM**

During the Conference, the participants will be given the opportunity to present scientific and technical developments, new building materials and products, scientific and methodical publications, etc.

#### PUBLICATIONS

According to the results of the conference, the best materials will be selected, which will be recommended for publication in professional editions of KNUCA.

#### SCIENTIFIC COMMITTEE

Kulikov P. (Chairman) – Ukraine Ploskyi V. (Deputy Chairman) – Ukraine Bondar O. (Deputy Chairman) – Ukraine

Sobczuk H. (PAN) – Poland Chepurna N. - Ukraine Derevinskyi V. – Ukraine Heher A. – Ukraine Kashchenko T. – Ukraine Klymchuk M. – Ukraine Kozhedub S. – Ukraine Koliakova V. – Ukraine Kochetov G. – Ukraine Mykhailovskyi D. – Ukraine Perehuda Y. - Ukraine Pidlutskyi V.– Ukraine Piskunov S.– Ukraine Pochka K. – Ukraine Priymak O. – Ukraine Priymachenko O. – Ukraine Ryzhakova G.– Ukraine Sakharov V.– Ukraine Sharapa S. – Ukraine Shebek N.– Ukraine Shults R.– Ukraine Skochko V. – Ukraine Slieptsov O. – Ukraine Tovbych V. – Ukraine Tsiutsiura S. - Ukraine Tuhai O. – Ukraine

#### **CONFERENCE PARTNERS**

Organizing Committee cordially thanks to Polish Academy of Sciences (Kyiv office) and personally – Prof. Henryk Sobczuk



shaft of the scraper conveyor, distributor disk and brush device. In machines with hydraulic drive, the torque from the main automobile engine is transmitted to the hydraulic system, which drives the scraper conveyor and disk. The hydraulic drive provides the possibility of smooth gradually changing the speed of the scraper conveyor and the rotational speed of the distribution disk, which allows you to establish the required density of material distribution (30...500 g/m<sup>2</sup>) and the width of the coating without changing the speed of the car.

The productivity of sandblasting machines is determined in the same way as self-propelled machines of continuous action, taking into account losses for loading the body material with ice, moving the car in a loaded and unloaded state and other auxiliary operations. The average productivity of machines for distributing materials against ice is 20...90 thousand  $m^2/g$ .

#### UDC 693.546(043.2)

#### Loveykin V., PhD, Professor (National University of Life and Environmental Sciences of Ukraine); Pochka K., PhD, Associate Professor (KNUCA) REALIZATION OF THE COMBINED MODE OF THE MOVEMENT OF ROLLER FORMING INSTALLATION ON ACCELERATION OF THE FOURTH ORDER

In the existing installations of superficial consolidation of concrete goods the crank- ram or the hydraulic drive of back and forth motion of the forming cart with the condensing rollers is used. During the constant starting and brake modes of the movement there are considerable dynamic loadings in elements of the driving mechanism and in elements of the forming cart which can lead to premature getting out of installation of the working condition.

For roller forming installation at consolidation of concrete mix it is desirable to have the constant speed of back and forth motion of the forming cart on all the site that positively would influence quality of a finished product. However in practice such mode of the movement can't be carried out as in him there are no sites of startup and braking without which there can't be a cyclic movement. Therefore it is offered to realize such mode of the movement of the forming cart at her movement from one extreme situation to another in which there would be sites of start-up and braking with the minimum dynamic loadings and the movement site with a constant speed.

For smooth process of start-up and braking of the forming cart it is offered to carry out it on the optimum mode of the movement on acceleration of the fourth order. At the same time the speed, acceleration, acceleration of the second order and acceleration of the third order of the forming cart change smoothly, without creating considerable dynamic loadings in installation that in turn positively influences its durability.

As a result of the conducted researches for the purpose of increase in reliability and durability of roller forming installation the combined mode of back and forth motion of the forming cart on acceleration of the fourth order is calculated. Kinematic characteristics of the forming cart at the combined back and forth motion mode on acceleration of the fourth order are calculated.

The design of roller forming installation with the drive from the high-moment step engine which is built in the rolling rollers of the forming cart for providing the combined back and forth motion mode on acceleration of the fourth order is offered.

Results of work can be further useful to specification and improvement of the existing engineering methods of calculation of driving mechanisms of cars of roller formation both at design/designing stages, and in the modes of real operation. Also results of work can be useful at design or improvement of mechanisms with back and forth motion of executive elements.

UDC 693.546(043.2)

Pochka K., PhD, Associate Professor (KNUCA); Gorobec A., Student (KNUCA) RESEARCH OF OPTIMUM CONSTRUCTIVE PERIMETERS OF THE

### DRIVING MECHANISM OF ROLLER FORMING INSTALLATION

with a recuperative drive mechanism

In the existing installations of superficial consolidation of concrete goods the crank- ram or the hydraulic drive of back and forth motion of the forming cart with the condensing rollers is used. During the constant starting and brake modes of the movement there are considerable dynamic loadings in elements of the driving mechanism and in elements of the forming cart which can lead to premature getting out of installation of the working condition.

For increase in efficiency of work with simultaneous cutting of costs of energy for ensuring technological process of consolidation of concrete mix and unloadings of the driving mechanism it is developed a design of roller forming installation which consists from the motionless portal and two forming carts which are executed with a possibility of reduction in back and forth motion from the general drive with two crank-ram mechanisms which cranks are rigidly fixed on uniform to a power shaft and are displaced between themselves on a corner  $\Delta \varphi = 90^{\circ}$ . When using the general drive on two forming carts the efficiency of installation increases, dynamic loadings in elements of her driving mechanism decrease, excess destructive loads of a frame design decrease and, respectively, the durability of installation in general increases.

The mathematical model of dynamics of the movement on the basis of which functions of change of kinetic energy of each element of installation and its total value, the moments of forces of resistance to movement of each forming cart, the moments from forces of inertia and the general moment of forces of resistance for each of forming carts are defined is developed for this installation, and also their total value given to a power shaft of installation is defined. Change of the specified functions depending on geometrical parameters driving to the mechanism is tracked, and also the optimum length of a rod at the invariable radius of a crank is determined.

As a result of the conducted researches it is established that for installation with a recuperative drive mechanism on two forming carts the ratio of lengths of

# **«BUILD-MASTER-CLASS-2017»**

Working program and proceedings of international scientific-practical conference of young scientists

Editors: Anna Heher, Volodymyr Skochko, Vasyl Pidlutskyi, Sergii Sharapa

Correctors: Sergii Kozhedub, Kateryna Lavrukhina

Editorial Committee is not responsible for the content of conference proceedings