Міністерство освіти Азербайджанської Республіки
Міністерство освіти і науки України

Азербайджанський архітектурно-будівельний університет
Національний університет «Полтавська політехніка
імені Юрія Кондратюка»

# BUILDING INNOVATIONS – 2020

Збірник наукових праць
за матеріалами

## III Міжнародної азербайджансько-української науково-практичної конференції

1 – 2 червня 2020 року

Баку – Полтава 2020

**UDK 658.586**

**Ramesh Kumar M.**, PhD, associate professor, Head of Department of Computer Science,
ORCID: 0000-0001-5345-2762, e-mail: proframeshkumar@gmail.com
Government Arts College (Autonomous), Nandanam, Chennai, India
**Chichulina K.V.**, PhD, associate professor,
ORCID: 0000-0001-7448-0180, e-mail: chichulinak@ukr.net
**Chichulin V.P.**, PhD, associate professor,
ORCID: 0000-0003-1838-7269, e-mail: chichulinvp@gmail.com
National University "Yuri Kondratyuk Poltava Polytechnic"

# MODERN RESOURCE-SAVING METAL STRUCTURES ON THE EXAMPLE OF A STARTUP

***Abstract.*** *Modern systems of resource-saving metal structures are presented. A thorough economic assessment was carried out and all the key indicators of the investment project were determined: the project goal, investment volumes, products and their competitiveness, the sales market and forms of implementation, the duration of the investment cycle as a whole and by stages, the main types of risk, the total cost of the project, sources of project financing, average annual income, internal rate of return, payback period. Structural systems are manufactured using Austrian technology with a focus on the Ukrainian market.*

***Keywords:*** *resource saving, startup, Austrian technologies, corrugated beams, metal structures.*

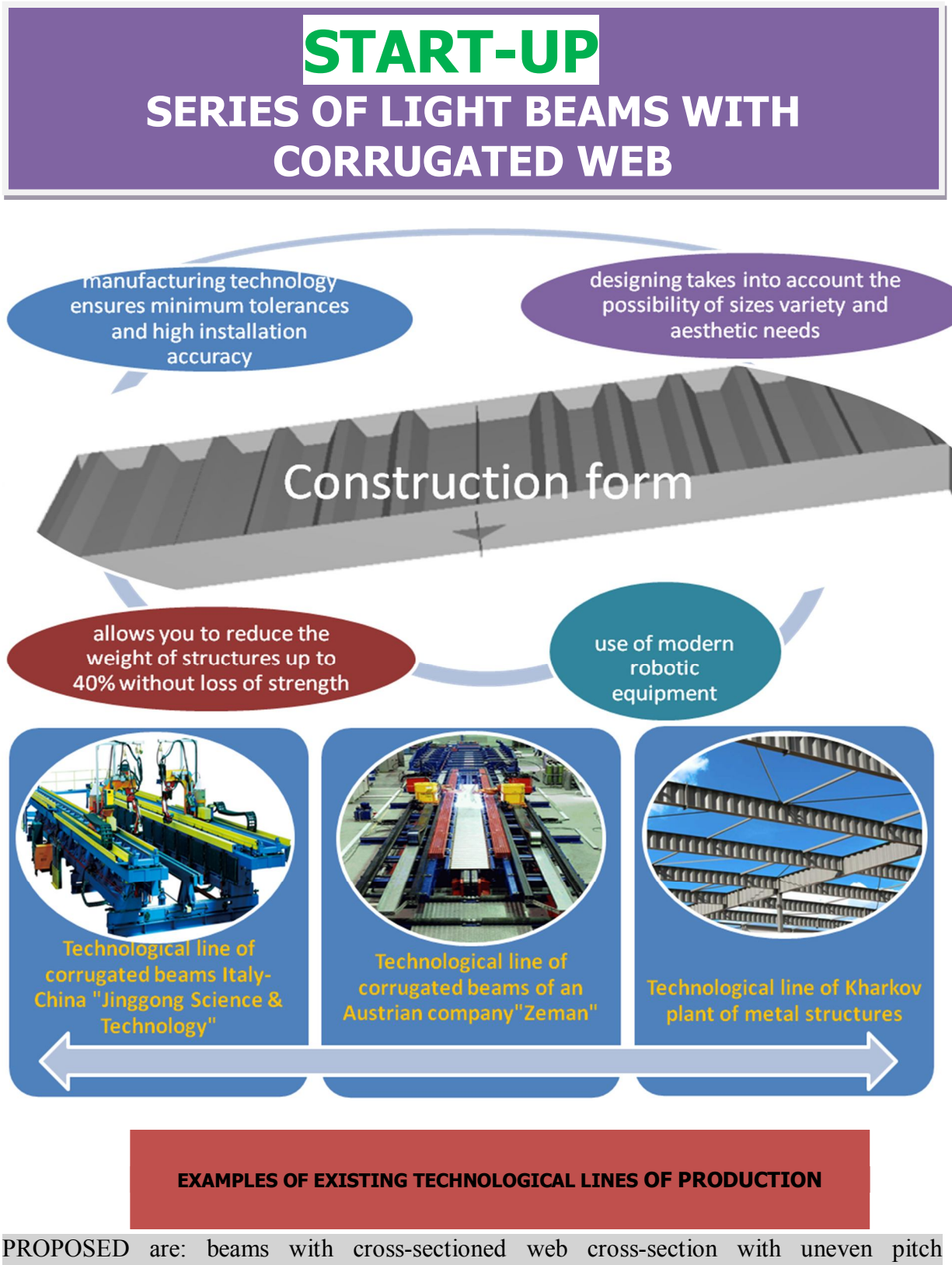
**Рамеш Кумар М.**, к.т.н., професор, завідуючий кафедрою комп'ютерних наук
ORCID: 0000-0001-5345-2762, e-mail: proframeshkumar@gmail.com
Урядовий коледж мистецтв (автономний), Нанданам, Ченнаї, Індія
**Чичуліна К.В.**, к.т.н., доцент,
ORCID: 0000-0001-7448-0180, e-mail: chichulinak@ukr.net
**Чичулін В.П.**, к.т.н., доцент,
ORCID: 0000-0003-1838-7269, e-mail: chichulinvp@gmail.com
Національний університет "Полтавська політехніка імені Юрія Кондратюка"

# СУЧАСНІ РЕСУРСОЗБЕРІГАЮЧІ МЕТАЛЕВІ КОНСТУКЦІЇ НА ПРИКЛАДІ СТАРТАПУ

***Анотація***. *Представлені сучасні системи ресурсозберігаючих металевих конструкцій. Здійснена ґрунтовна економічна оцінка та визначені всі ключові показники інвестиційного проекту: ціль проекту, об'єми інвестування, продукція та її конкурентоспроможність, ринок збуту та форми реалізації, тривалість інвестиційного циклу в цілому і за стадіями, основні види ризику, загальна вартість проекту, джерела фінансування проекту, середньорічний прибуток, внутрішня норма доходності, період окупності. Конструктивні системи виготовляються за австрійською технологією з орієнтацією на український ринок.*

***Ключові слова:*** *економія ресурсів, стартап, австрійські технології, гофровані балки, металеві конструкції.*

***Ключові слова:*** *ресурсозбереження, стартап, австрійські технології, гофро-балки, металеві конструкції.*




PROPOSED are: beams with cross-sectioned web cross-section with uneven pitch corrugations; beams of box section with filling of space between webs of expanded polystyrene; with belts of welded and rolled brands, fastened with a magnificent lattice, fastened with a cross lattice, a lattice of arched elements and others.

***Figure 1 – Graphical representation of the startup project: light structures of beams with a corrugated web***

**The purpose of the project** is to develop a sound investment project for the use of new types of boxed corrugated beams on the basis of PJSC "Kharkiv plant of metal structures" with subsequent implementation throughout Ukraine and beyond. PJSC "Kharkiv plant of metal structures" is a specialized enterprise for the production of various types of building structures made of ferrous metals: girders, overpasses, galleries, supports, including power lines, special towers, sections and supports of bridges, structures made of sheet metal - silos of structures, bunkers, etc. Shot blasting. Metal cutting on a plasma cutting machine. Rolling.

**Investment volumes:** for the period from 2019 to 2021, it is planned to create a production line. After the end of this period, PJSC "Kharkiv plant of metal structures" plans to review the production program and, in case of constant demand for products from 2019, its expansion, to meet the needs of potential buyers of products.

**Products and its competitiveness:** welded steel beam (patent No. 64443), steel beams with transverse wall of the box section with uneven pitch corrugation (patent No. 45328), the steel beam with profiled wall with intermittent lap seams (patent No. 51629), steel beams with a transversely profiled wall of the box-section belts from rolling t - (patent No. 64444), steel beams with a transversely profiled web of the box section with integral t-zone (patent No. 64445).

**Market and forms of implementation:** the project provides for the acquisition of the market all over Ukraine and abroad, with plans to bring to the market products of PJSC "Kharkiv plant of metal constructions" as small and wholesale enterprises that implement the metal structures on the territory of Ukraine; enterprises and organizations specializing in metal structures.

**The duration of the investment cycle as a whole and by stages:** the total duration of the settlement period in this work is 3 years. The main stages of implementation of this business plan are its adaptation to the production base of the enterprise and its creation; the stage of business development and increase in sales; the stage of further expansion in 2019 according to the plan.

**The main types of risk:** technological, in the case of equipment failure, there is a risk of production downtime; financial, in the case of changes in the cost of money over time, it is necessary to revise the estimate of production; commercial, in the case of unattainable planned sales volumes.

**Total cost of the project:** 1025000 UAH.

**Sources of funding for the project:** it is planned to Finance the project at the expense of PJSC "Kharkiv plant of metal structures", which became possible when reserving profits in 2019.

**Average annual income:** according to the profit plan in 2020, it is planned to receive 10379,1 UAH, in 2021-20794,2 UAH, in 2022 33324,6 UAH.

**Internal rate of return:** 15.83%, which is a guarantee that the project will be profitable with an increase in the impact of various risks on it.

**Payback period:** 1.39 years, that is, it is necessary for PJSC "Kharkiv plant of metal structures" to return the amount of investment capital if the factors affecting the project remain unchanged.

As a result of techno-economic comparison of the designed constructions of beams with a typical design of composite beams revealed that the use of beams with a double contoured wall with belts of t-rolling provides a reduction in material consumption up to 18%, and the steel beam with double contoured wall with belts of composite t-up to 9% and to 10% in comparison with steel beams with profiled wall with prawnymi and continuous lap seams. So, it is advisable to use new types of beams with a double profiled wall, due to the reduction of material consumption and the estimated cost of these types of structures in comparison with traditional options.

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