SOI: 1.1/TAS
DOI: 10.15863/TAS
Scopus ASJC: 1000

ISSN 2308-4944 (print)
ISSN 2409-0085 (online)

№ 05 (109) 2022

Teoretičeskaâ i prikladnaâ nauka

Theoretical & Applied Science

Philadelphia, USA

Teoretičeskaâ i prikladnaâ nauka

Theoretical & Applied Science

05 (109)

2022

International Scientific Journal

Theoretical & Applied Science

Founder: **International Academy of Theoretical & Applied Sciences**

Published since 2013 year. Issued Monthly.

International scientific journal «Theoretical & Applied Science», registered in France, and indexed more than 45 international scientific bases.

Editorial office: http://T-Science.org Phone: +777727-606-81

E-mail: T-Science@mail.ru

ISSN 2308-4944

9 772308 494225 05

International Scientific Journal

Theoretical & Applied Science

International Scientific Journal

Theoretical & Applied Science

ISJ Theoretical & Applied Science, 05 (109), 960.
Philadelphia, USA

Impact Factor ICV = 6.630

Impact Factor ISI = 0.829
based on International Citation Report (ICR)

The percentage of rejected articles:

ISSN 2308-4944

Impact Factor:					
	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 1.582	РИНЦ (Russia) = 3.939	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 8.771	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2022 **Issue:** 05 **Volume:** 109

Published: 18.05.2022 http://T-Science.org

Issue Article

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PROBLEMS OF LAND DESERTIFICATION IN THE TURKESTAN REGION AND AFFORESTATION AS A SOLUTION TO THE PROBLEM

Abstract: *Desertification is not only about deserts, and it is not only happening in Africa. Desertification is a process in which desert conditions develop as a result of degradation processes, mostly due to a significant decrease in soil productivity. The most vulnerable territories include regions with arid, subarid and dry climatic conditions,*

which are very sensitive to human and animal activity, as well as to climate change. Soils become eroded and saline, they lose their ability to retain moisture, the groundwater level decreases, vegetation cover decreases or disappears altogether. Desertification leads to the fact that the land becomes infertile. Desertification, land degradation and drought (DLDD) are global problems. According to the UN, drylands occupy 30% of the earth's surface in more than 100 countries, and 2 billion people currently live on these lands. If the scenario proposed by the UN is confirmed, taking into account the current rate of desertification, by 2025 every fifth inhabitant of the Earth will live in a drought-prone area. At the moment, more than two billion hectares of productive land have been degraded worldwide, and we continue to degrade an additional 12 million hectares annually.

***Key words**: forest, trees, grass, flowers, ground, in-vitro, sun radiation, ecosystem, locality, agroforesting.*

***Language**: English*

Citation: Tulentarva, A. A., et al. (2022). Problems of land desertification in the Turkestan region and afforestation as a solution to the problem. *ISJ Theoretical & Applied Science, 05 (109),* 501-507.

Soi: http://s-o-i.org/1.1/TAS-05-109-53 ***Doi***: https://dx.doi.org/10.15863/TAS.2022.05.109.53

***Scopus ASCC**: 1100.*

Introduction

По результатам технического задания грантовского проекта КН МОН РК утвержденного приказом Председателя КН МОН РК от «2» марта 2022 года № 27-нж

Desertification is a silent, invisible crisis that destabilizes the global community. Desertification exacerbates economic, social and environmental problems such as poverty, poor health, food insecurity, loss of biodiversity, water scarcity, reduced resilience to climate change and forced migration. Poverty is a cause and consequence of desertification. Up to 90% of people living in arid areas are citizens of developing countries. People living in poverty and suffering from desertification at the same time may become even poorer due to the lack of sustainable land. Moreover, desertification, exacerbated by climate change, can lead to famine in the least developed countries. According to WHO, the potential impact of desertification is the risk of malnutrition due to a decrease in food and water supplies, clean water, the risk of respiratory diseases caused by atmospheric dust from wind erosion, the risk of the spread of infectious diseases during forced migration due to desertification. Desertification has a direct impact on food security: we cannot continue land degradation if there is a target to increase food production by 70% by 2050 to ensure global food security. Desertification has a negative impact on biodiversity as a result of loss of species diversity, reduced ecosystem functionality, invasion of new species, as well as changes in biomass production. DLDD have a negative impact on the availability, quantity and quality of water resources, which lead to water scarcity. - The loss of productive land encourages people to make risky life decisions. In rural areas, where people depend on scarce productive land resources, land degradation is the driving force behind forced migration. It is projected that by 2045, about 135 million people may be forced to migrate as a result of desertification. United Nations Convention to Combat Desertification (UNCCD) As a global platform, adopted on June 17, 1994, the BWC is the only legally binding international agreement linking environment and development with sustainable land management. The Convention specifically addresses arid, semi-arid and dry sub-humid areas, known as arid areas, where some of the most vulnerable ecosystems can be found. The ten–year strategy of the UNCCD states the main goal - "to create a global partnership to prevent desertification, land degradation and mitigate the effects of drought in affected areas in order to support poverty reduction and ensure environmental sustainability." The objectives of the UNCCD include providing a global platform to support national and regional strategies, scientific and technical knowledge, informing the general public, lobbying and resource mobilization. The executive institutions and bodies of the BWC are the Conference of the Parties, the Committee for the Review of the Implementation of the Convention, the Committee on Science and Technology, the Global Mechanism responsible for Finance, and the BWC Secretariat responsible for organizational matters. Issues on achieving a neutral balance of land degradation, as well as issues related to the strategic implementation of the Convention, the Secretariat's work plan and other tasks will be considered during the 13th session of the Conference of the Parties in Ordos.

№	ИРН	Наименование	Заявитель	Научный руководитель	Период реализации	Группа объектов ГНТЭ	Статус	Готовность	Создать
1	AP09561600	Лесопроектирование: конструкция уникального образца лесного массива по системе in-vitro	Частное учреждение "Шымкентский университет"	Битемиров Кайрат Турлыбаевич	2022 - 2024	Конкурс на грантовое финансирование исследований молодых ученых по проекту «Жас ғалым» на 2022-2024 годы	Создано	100%	Действие

Pic.1

II. RESEARCH METHODOLOGY AND ETHICAL QUESTIONS.

As a statement of clarity of the scientific research question, it is possible to identify the question according to which the interdisciplinary norms of rational monitoring of green technologies through applied forest design will have a positive impact on the environmental, economic and social situation in the region. This formulation clearly reflects the purpose, question, assumptions and hypotheses of the research plan, justifying their degree of scientific significance systematically and systematically. To answer this question, an attempt was made to justify the present using three hypotheses, the realism of which is associated with the goal and expected results of the research plan. The primary hypothesis assumes that interdisciplinary norms of rational monitoring of green technologies through applied forest design have a positive impact on the ecological situation in the region, since a large number of deciduous trees emit a sufficiently large amount of oxygen, a large number of coniferous trees a large number of phytoncites, and mountain air is an excellent wind tunnel for correct propagation. The secondary hypothesis suggests that interdisciplinary norms of rational monitoring of green technologies through applied forest design have a positive impact on the economic situation in the region, since in the future nearby villages will be able to collect and sell such berries as blackberries, raspberries, blueberries, cranberries, blueberries, sea buckthorn, as well as nuts, mulberries and pine nuts, not counting the organization of tourist centers and shops where tourists can buy. The tertiary hypothesis assumes that interdisciplinary norms of rational monitoring of green technologies through applied forest design have a positive impact on the social situation in the region, since it will immediately provide a large number of jobs, organize the infrastructure of service personnel, and other favorable changes for the region. To prove the hypotheses, an attempt was made to justify them using research strategies and approaches that are supposed to be used in the program and descriptive, correlation, and experimental studies depending on the periodicity of tasks, the sequence of which varies depending on a particular stage of the program implementation. The study has a clear planned achievement of the goal through specific actions for a systematic transition from one task to another. In addition to a certain periodicity, this report also illustrates how the resources, timing, and content of the work performed correspond to the goals, objectives, methodology, and expected results of the study. As a research strategy, this can be defined by the use of one methodological tool in one task, the use of other techniques in the second, and the use of other techniques in the third task. Research approaches in research are experimental in nature, where project participants try various methodological tools in accordance with the results obtained. A number of approaches have been developed, as indicated in this section, for which sequences will be defined. These approaches in the framework of the research plan include experiments that are completely new and have not previously been used in such studies. Due to the urgency of the need for such an experiment, it can be considered quite modern. All experiments are planned with a certain frequency and systematics, encoded in a certain algorithm, which justifies the correctness of the design of experiments for its subsequent statistical data processing.

III. RESULTS.

Central Asia is a classic example of an arid and subarid region characterized by serious transboundary desertification problems. According to the GTZ publication, there is currently nowhere an entire region with an area of more than four million square kilometers that faces a greater threat from desertification than the region between the Caspian Sea and the Pamir Mountains (1). At the moment, more than 2/3 of the territory of Central Asia is arid lands. For example, in Kazakhstan, according to World Bank estimates, 66% of the country's territory is subject to desertification (2). The consequences of desertification are exacerbated by climate change and increasing anthropogenic pressures. Central Asia is one of the regions most vulnerable to climate change. According to climate forecasts, a noticeable increase in temperature (up to 2-4 degrees), uneven precipitation distribution, intensive melting of glaciers (currently 46 glaciers in the region are subject to melting) - all this will lead to an increase in the desertification process in the long term (3). Improper use of land during the Soviet Union, including intensive irrigation, overgrazing of steppes and

deforestation of mountain forests in a vast dry zone with limited ecological tolerance, caused numerous environmental consequences. Further economic growth led to increased anthropogenic pressures and, as a result, to land degradation. It is estimated that 4-10% of cultivated areas, 27-68% of pastures and 1-8% of forests are significantly degraded in Central Asia at present (4). The causes of land degradation are numerous, complex and vary from country to country, but are generally associated with abuse and overexploitation of the natural resource base, in particular with improper and unsustainable agricultural practices, excessive grazing of pastures, deforestation, forest degradation and natural disasters (5). As in the whole world, in the countries of Central Asia, DLDD is not only a serious environmental, but also an economic and social problem. According to the FAO report, the economies of Central Asia are still largely based on agriculture, which accounts for 10-38% of GDP and provides 18-65% of employment, which makes the economies of these countries vulnerable to droughts by reducing agricultural production, negatively affects food prices, trade, market access and it leads to a decrease in farmers' incomes and unemployment. DLDD directly affects the livelihoods of rural populations, reducing the productivity of land resources and having a negative impact on the stability and functioning of natural systems, as well as services dependent on these systems (6). According to reports, agricultural yields in the region have decreased by 20-30% since these countries gained independence, which leads to annual losses of agricultural production in the amount of $ 2 billion (7). Unfortunately, weak institutional infrastructure, low technical, administrative and financial capacity of countries, insufficient information exchange and imperfect hydrometeorological monitoring - all this does not contribute to combating desertification and reducing disaster risk (8). Regional cooperation on combating desertification. Realizing that desertification and drought are cross-border problems requiring joint action, and guided by the mechanisms laid down in the UNCCD, the Central Asian countries agreed and adopted the Subregional Action Program of the Central Asian Countries to Combat Desertification in the context of the UNCCD in 2003 (9). The objectives of this program were the coordination of subregional interests, the exchange of information and experience, the involvement of donors in the implementation of the BWC, synergy in the implementation of environmental conventions in the subregion, the development and implementation of joint programs, and the improvement of socio-economic conditions. In the future, this program served as a platform for launching the Central Asian Countries' Land Management Initiative (ISCAUSR) (10). Despite the existing criticism, the creation of the SLMIS can be considered an interesting example of regional cooperation in combating desertification: cooperation took place between countries, between donors, as well as between countries and donor organizations. During the first phase (2006-2011), 4 regional and 7 national projects were implemented in the field of pasture and agricultural land improvement (11). The main goal of the second phase (2018-2022) is to strengthen integrated management of natural resources on drought-prone and saline agricultural production lands in Central Asia and Turkey. Another example of regional cooperation is the analytical project "Economics of Land Degradation in Central Asian Countries (2014-2016), implemented to ensure understanding and awareness of stakeholders about the economic value of productive land based on market and non-market values. The project was implemented under the auspices of the UNCCD with the participation of GIZ, ICARDA, the governments of the countries of the region and the Regional Environmental Center of Central Asia. According to the publication, the results of the project revealed that in case of inaction, we will have 53 billion in costs to combat land degradation and 288 billion in losses due to inaction over a 30-year horizon. Nevertheless, investments in restoration are profitable - for $ 1 spent on land restoration - $ 5 return. The UNCCD secretariat is currently working on a Regional Initiative to develop drought risk management strategies for Central Asia (12). The objectives of the initiative are to develop a common strategic program for drought management and drought resilience, strengthen the political initiative on drought preparedness and resilience, identify specific needs and exchange successful experiences in the region and the possibility of cooperation (13).

IV. DISCUSSION.

National measures in Kazakhstan

Kazakhstan ratified the UN BWC in 1997. In the same year, the Government of the Republic of Kazakhstan adopted a National Action Plan to Combat desertification. In January 2005, the Government of the Republic of Kazakhstan approved a program to combat desertification in the Republic of Kazakhstan for 2005-2015. In 2008, due to the optimization of the number of sectoral Government programs, this program was abolished, and only certain activities of this program were included in the government's medium-term environmental protection program in the "Zhasyl Damu" Program for 2010-2014 (14). The concept of transition of the Republic of Kazakhstan to a "green economy" confirms the seriousness of the problem of desertification and suggests adhering to the principles of "green" agriculture such as: a) prevention of land degradation and restoration of degraded lands; b) prevention of further dislocation of pastures; c) efficient use of water; d) rational use of resources; e) minimization and reuse waste; f) carbon dioxide capture. Within the framework of the GEF-

UNDP project "Support in updating the National Action Plan, as well as in the process of reporting and reviewing the performance of activities within the framework of the implementation of the UN Convention to Combat Desertification in Kazakhstan", the document "Strategic measures to combat desertification in the Republic of Kazakhstan until 2025" was prepared (15).

National measures in Kyrgyzstan

Kyrgyzstan has been a party to the UNCCD since 1997. The Government adopted the National Action Program to Combat Desertification in 2000 and the National Framework Program for Sustainable Land Management for 2006-2016. These programs are aimed at developing sustainable land use, increasing the productivity of arable land and reducing poverty in rural areas. Despite the successful implementation of many pilot projects in the field of sustainable land use and best practices in agriculture in 2000-2007, weak changes are slowed down by the processes of land degradation, a decrease in agricultural production and an increase in poverty in rural areas (16). Kyrgyzstan should strengthen its actions for the full implementation of the above-mentioned programs. In July 2017, with the support of the UNDP-GEF project "Strengthening institutional and legal capacity to ensure the improvement of the national environmental information management and monitoring system", the fifth meeting of the interdepartmental expert group on the implementation of the UN Convention to Combat Desertification was held in Kyrgyzstan. The participants of the expert group discussed the implementation and implementation of the initiative to establish the goals of neutral balance of land degradation (17).

National measures in Tajikistan

Tajikistan joined the UN BWC in 1997. In 2001, the National Action Program to Combat Desertification was adopted, aimed at combating environmental degradation and irrational land use. To implement the Convention, the Government has adopted a Program of economic transformation of the agro-industrial complex and a Program on environmental education and upbringing of the population for the period up to 2010 (18). The draft Strategy for the Development of the Private Sector in Tajikistan (2007-2010) paid special attention to ensuring environmentally sustainable growth and promoting the rational use of land. Tajikistan is one of the most economically vulnerable countries to the consequences of desertification in Central Asia, as the socio-economic consequences of desertification threaten a great disaster for residents who may become environmental refugees (19). In this regard, the country recognizes the need to develop specific pilot projects to combat erosion and desertification.

National measures in Turkmenistan

Turkmenistan was one of the first to ratify the UNCCD in 1996, starting a year later to implement the national action plan, the main aspects of which were rational use of pastures, forestry development, consolidation and afforestation of mobile sands, improvement of irrigated lands, applied research. In Turkmenistan, deserts occupy 80 percent of the territory, and both cultivated and natural lands are subject to desertification to varying degrees. Special attention is paid to the problem of degradation of desert and foothill pastures and irrigated lands (20). The National Institute of Deserts, Flora and Fauna (NIPRWM) operates in the country The State Committee for Environmental Protection and Land Resources of Turkmenistan. The National Forest Program and the National Climate Change Strategy are being implemented, the Law on Pastures has been introduced, the Water Code has been revised, the Land Code has been amended, the National Climate Change Program has been adopted and the National Action Program to combat desertification has been revised. Rational use and protection of land resources is one of the priorities in the economic policy of the state, which is reflected in the Strategy 2030 (21).

National measures in Uzbekistan

Uzbekistan was one of the first to ratify the BWC. A National Strategy to Combat Desertification was developed in 1999. Currently, a draft of the Second National Strategy has been prepared (22). This Program, as well as the National Strategy for Sustainable Development, are the dominant strategies for combating desertification. In recent years, two state programs on the Aral Sea have been adopted (23). Programs aimed at combating desertification, water resources management, as well as a forest resources management program are being implemented. The fight against DLDD in Uzbekistan is carried out through concrete measures to improve the land reclamation condition within the framework of the reclamation program, the use of experience and best practices for the balanced use of land for ecology and consumption, the introduction of new innovative resource-saving technologies in the land use system; attracting investments in the practice of sustainable land management to ensure, develop, create and maintain sustainable systems power supply. Uzhydromet is an institution responsible for activities under the United Nations Framework Convention on Climate Change (UNFCCC) (24), including obligations under the UNFCCC and the UNCCD. Recently, projects such as the GEF/UNDP Project "Reducing the burden on the use of natural resources as a result of competing exploitation of non-irrigated arid lands in mountainous, semi-desert and desert landscapes of Uzbekistan" (2014-2018), the GEF/World Bank Project "Sustainable Agriculture and mitigation of climate change", including 1.2 million Dollars to combat desertification, the GEF/FAO Project (25) "Capacity building and support for solutions to promote and disseminate SLM

and combat desertification, land degradation and drought" (2014-2016)..

V. ACHNOWLEGEMENTS.

This study was carried out on the basis of a private institution "Higher Multidisciplinary Medical College "Turkestan"", which has a certain room and equipment for conducting research. It is also necessary to note the high level of involvement of the staff of the college, who have made a significant contribution to the development of this topic. As for the student potential, there were many activists who agreed to take part in the research in various positions listed below. These positions include data and positions from the table below. Thus, as a legal experiment, the research group planned a study with the participation of 16 full-time students in the specialty of nursing. So 8 students participated in an experiment where each of them was given the role of an active stalker and a passive stalker, as well as an active victim and a passive victim. Four students monitored and four students supervised each group of tests.

VI. CONCLUSION.

In conclusion it is actual to identify that, despite the measures taken at the national and regional level, all Central Asian countries are experiencing certain difficulties related to the implementation of conventions, including the UN BWC. At many regional events previously held by CAREC, the lack of appropriate institutional, financial and technical capabilities at the national level to fulfill obligations, the need for technical and methodological support for reporting, involvement of a wide range of stakeholders, insufficient interdepartmental cooperation at the national and regional levels and the lack of a single "voice of the region" on international platforms were emphasized. As part of the work with environmental conventions, the Regional Environmental Center plans to analyze and identify the full range of problems and identify the needs of countries for the implementation of conventions in the region through a survey among representatives of the Convention Secretariats and directly decision makers at the national level.

VII. RECOMMENDATION

As a recommendation, more importance should be given to grant financing, since it is the sector of scientific research that has more versatile tools for monitoring, forest design and adaptation of samples of deciduous and coniferous crops to any conditions. The present is, in principle, possible, given the international obligations of the Republic of Kazakhstan, to direct a certain percentage of industrial facilities that they charge for ecology from industrial enterprises to increase the area of forests.

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Impact Factor:					
	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 1.582	РИНЦ (Russia) = 3.939	PIF (India) = 1.940
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SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2022 **Issue:** 05 **Volume:** 109

Published: 18.05.2022 **http://T-Science.org**

Issue Article

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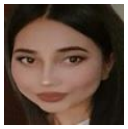

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CONCEPTUAL PROBLEMS OF INTENSIVE FOREST INDUSTRIES IN MACRO AND MICRO LEVELS

Abstract: *The vast territory of the Republic of Kazakhstan, the diversity of its climatic and economic conditions, the composition and multifunctionality of forests determine the diversity of forms of forestry, technologies and methods of forest cultivation. The transition from extensive to intensive forest management, from "gathering" to*

civilized forest cultivation, is the inevitable and only way to further develop forestry in conditions of increasing demand for wood. Depletion of natural forest resources, increase in the cost of timber processing products, as well as the competition in the timber markets, which is becoming tougher due to the wide supply of plantation timber from "warm" tropical countries, today forces the world's leading forest powers to make decisions on the intensification of forest cultivation, to direct a significant amount of investment in forestry.

***Key words**: forest, trees, grass, flowers, ground, in-vitro, sun radiation, ecosystem, locality, agroforesting.*

***Language**: English*

Citation: Raimova, Sh., et al. (2022). Conceptual problems of intensive forest industries in macro and micro levels. *ISJ Theoretical & Applied Science, 05 (109),* 508-514.

Soi: http://s-o-i.org/1.1/TAS-05-109-54 ***Doi***: https://dx.doi.org/10.15863/TAS.2022.05.109.54

***Scopus ASCC**: 1100.*

Introduction

По результатам технического задания грантовского проекта КН МОН РК утвержденного приказом Председателя КН МОН РК от «2» марта 2022 года № 27-нж

The forests of the Republic of Kazakhstan have a huge resource potential, perform important ecological and socio-economic functions. The processes of formation of the national forest policy, regulatory framework, state forest management require complete and reliable information about the state of forests, the dynamics of their development. The organization of multi-purpose and non-depleting use of forests, forest planning and forestry regulation are impossible without detailed knowledge of forest resources, their quantity and quality. Along with national priorities, Kazakhstan's forests are also of global importance. Ensuring sustainable forest management, monitoring the state of forests, timely identification and forecasting of processes that have a negative impact on forests are international obligations of the Republic of Kazakhstan adopted within the framework of global and regional forest negotiation processes. Ensuring the existing needs for reliable information about forests and forest resources are the main tasks of forest survey work, which is currently based on forest management and state forest inventory. The choice of forest accounting works and their composition are determined by the tasks at various levels of forest management, as well as the tasks of organizing the economic use of forests. At the republican level, information on forests and forest resources should provide information support for strategic planning and regulatory legal regulation of the sphere of forest relations, assess the effectiveness of the use, protection, protection and reproduction of forests, as well as ensure the fulfillment of international obligations assumed by the Republic of Kazakhstan. At the regional level, information on forests and forest resources is necessary to ensure the protection, protection and reproduction of forests, the organization of the use of forest resources, high-quality forest planning and forestry regulation. Forest users need a more detailed description of forests at the forest site level. In order to develop and implement forest development projects, ensure economic management of forests, they need knowledge about the root stocks of wood, its quality and assortment structure. The main tools for obtaining information about the state of forests and the availability of forest resources are forest management measures. In the interpretation of modern forest legislation, forest management includes: the design of forestry, the design of operational, protective and reserve forests, especially protective forest areas, the design of forest areas, fixing the boundaries of forests on the ground, the design of measures for the protection, protection and reproduction of forests, as well as forest taxation. When conducting forest taxation, qualitative and quantitative characteristics of forest resources are identified, on the basis of which the design and organization of forest use are provided.

№	ИРН	Наименование	Заявитель	Научный руководитель	Период реализации	Группа объектов ГНТЭ	Статус	Готовность	Создать
1	AP09561600	Лесопроектирование: конструкция уникального образца лесного массива по системе in-vitro	Частное учреждение "Шымкентский университет"	Битемиров Кайрат Турлыбаевич	2022 - 2024	Конкурс на грантовое финансирование исследований молодых ученых по проекту «Жас ғалым» на 2022-2024 годы	Создано	100%	Действие

Pic.1

II. RESEARCH METHODOLOGY AND ETHICAL QUESTIONS.

As a statement of clarity of the scientific research question, it is possible to identify the question according to which the interdisciplinary norms of rational monitoring of green technologies through applied forest design will have a positive impact on the environmental, economic and social situation in the region. This formulation clearly reflects the purpose, question, assumptions and hypotheses of the research plan, justifying their degree of scientific significance systematically and systematically. To answer this question, an attempt was made to justify the present using three hypotheses, the realism of which is associated with the goal and expected results of the research plan. The primary hypothesis assumes that interdisciplinary norms of rational monitoring of green technologies through applied forest design have a positive impact on the ecological situation in the region, since a large number of deciduous trees emit a sufficiently large amount of oxygen, a large number of coniferous trees a large number of phytoncites, and mountain air is an excellent wind tunnel for correct propagation. The secondary hypothesis suggests that interdisciplinary norms of rational monitoring of green technologies through applied forest design have a positive impact on the economic situation in the region, since in the future nearby villages will be able to collect and sell such berries as blackberries, raspberries, blueberries, cranberries, blueberries, sea buckthorn, as well as nuts, mulberries and pine nuts, not counting the organization of tourist centers and shops where tourists can buy. The tertiary hypothesis assumes that interdisciplinary norms of rational monitoring of green technologies through applied forest design have a positive impact on the social situation in the region, since it will immediately provide a large number of jobs, organize the infrastructure of service personnel, and other favorable changes for the region. To prove the hypotheses, an attempt was made to justify them using research strategies and approaches that are supposed to be used in the program and descriptive, correlation, and experimental studies depending on the periodicity of tasks, the sequence of which varies depending on a particular stage of the program implementation. The study has a clear planned achievement of the goal through specific actions for a systematic transition from one task to another. In addition to a certain periodicity, this report also illustrates how the resources, timing, and content of the work performed correspond to the goals, objectives, methodology, and expected results of the study. As a research strategy, this can be defined by the use of one methodological tool in one task, the use of other techniques in the second, and the use of other techniques in the third task. Research approaches in research are experimental in nature, where project participants try various methodological tools in accordance with the results obtained. A number of approaches have been developed, as indicated in this section, for which sequences will be defined. These approaches in the framework of the research plan include experiments that are completely new and have not previously been used in such studies. Due to the urgency of the need for such an experiment, it can be considered quite modern. All experiments are planned with a certain frequency and systematics, encoded in a certain algorithm, which justifies the correctness of the design of experiments for its subsequent statistical data processing.

III. RESULTS.

As a result of extensive forestry in many regions of the forest zone of Kazakhstan, indigenous formations are changing at an increasing pace to derived forests formed by soft-leaved species, which are fixed as the main forest-forming species (1). This entails the loss of the gene pool of valuable coniferous species, a decrease in the commercial, qualitative, sanitary characteristics of forests and, most unfortunately, the loss of the culture of forestry for the reproduction and cultivation of sustainable forests and high-grade business timber (2). In Kazakhstan, the need to intensify forestry the economy is also caused by difficult natural and climatic conditions. The bioclimatic potential (the aggregate indicator of heat and moisture availability) of our country is 2.7 times lower than in the USA and 2.2-2.4 times lower than in Western European countries (3). Of the total forest area in the Republic of Kazakhstan, only 10.8% are characterized by II and higher bonitet. In the most common types of forests of the North Kazakhstan and Eastern regions of the Republic of Kazakhstan, the actual productivity of pine and spruce stands ranges from 35% to 53% of the potential. The intensive

model of forestry, first of all, allows achieving high economic efficiency of the forest sector, increasing forest productivity and the volume of timber harvesting, primarily in areas with developed social and transport infrastructure, which will fully meet the needs for wood while preserving protected forests, specially protected and intact natural territories. The ways of intensification of forestry have been sufficiently studied and confirmed by the practice of world and domestic forestry (4). Kazakhstan has a huge positive experience in artificial and natural ways of creating high-performance forest plantations, increasing the genetic value of forest seed material and soil fertility, introduction tests and cultivation of woody exotics (5). Reproduction of forests with economically valuable species, systematic care of growing forests, forest breeding and genetics are those tools intensification, which can significantly increase the "removal" of wood from a unit of forest area in a shorter period of time, maintain the stand at maximum growth and radically improve the quality and commodity structure of forests (6). Intensive forestry management is a complex process from a technological point of view, which can be successfully carried out only by highly qualified forestry specialists (7). For example, as a result of commercial logging of forest care, the main result should be achieved – the maximum a liquid stock of wood of the highest value by the age of the main felling, and not stands upset by felling to obtain momentary income (8). Such specialists should have deep theoretical knowledge and practical training, which can be provided only in specialized forestry universities with educational and experimental forestry (9). Important for the implementation of an intensive forestry model (10) The role of forestry is played by high-precision, scientifically-based, modern forest management, which should ensure maximum economic, environmental and social efficiency of forestry in the long term, including the calculation of scientifically based norms for the use of forests, all its utilities and services (11). As a result of forest management design, all forestry measures are tied in kind to specific allotments, which requires an error-free determination of their tax characteristics, which can only be achieved by applying modern methods and technologies of forest inventory, including various methods of remote sensing of the Earth (12).

IV. DISCUSSION.

In recent decades, there has been a sharp reduction in the volume of forest management work, primarily forest taxation, which has led to a significant decrease in the level of information support for the industry (13). As of January 1, 2021, information about only 18% of forests with a taxing period of less than 10 years can be considered relatively reliable. 71% of Kazakhstan's forests are characterized by 17 forest management materials dating back 20 years or more. At the same time, the critical indicator of the reliability of forest taxation materials used for forest development comes after 10-12 years from the moment of its implementation (14), and when conducting intensive forestry – after 5-7 years (15). The decrease in the volume of forest management was not the result of changes in regulatory regulation or the implementation of government decisions. It took place against the background of an increase in the volume of cadastral works in forests (16). Of the funds provided by the republican budget for forest survey work – more than 70% (at least 3 billion rubles) were annually sent for cadastral registration of forests, the expediency and relevance of which is highly questionable, especially for reserve forests and forests not involved in intensive use (17). Along with the decline in the volume of forest management, there was also a decrease in its quality everywhere. Since the beginning of the 2000s, high-precision measuring and eye-measuring methods of forest taxation have been replaced by less expensive ones (18). Already by 2010, more than 70% of forest taxing works began to be carried out without conducting a full-scale survey of forest plantations, using methods of updating early forest management materials (19). This state of affairs persists today. The decision to grant forest users the rights to carry out forest taxation did not lead to a way out of the current crisis (20). Moreover, due to the uncertainty of regulatory regulation of forest management issues and the lack of control by forest management bodies over the quality of forest management work, "custom-made" forest management has become widespread, as a result of which classical forest management has been replaced by a mine of plantations suitable for logging (21). Unskilled and 18 uncontrolled performers of forest taxing works began to overestimate the calculation of use for valuable species everywhere, to "optimize" the age of plantings, their composition and completeness (22). And all this is solely for the purpose of obtaining additional profit from the exploitation of forests. The tasks of the state forest inventory (GIL) include the assessment of quantitative and qualitative characteristics of forests, applicable at high spatial levels: the Republic of Kazakhstan, the forest district, the subject of the Republic of Kazakhstan. Obtaining information about forests at the level of a forest allotment, forest quarter or forestry during the state forest inventory is not provided (23). During the state forest inventory, along with quantitative and qualitative characteristics of forests, indicators are determined, the need for which is due to the fulfillment by the Republic of Kazakhstan of international obligations related to the solution of global tasks on adaptation of forests to climate change and their mitigation, conservation of forest biological diversity. The information obtained during the state forest inventory is used for the purpose of timely identification and forecasting of the development of

processes that have a negative impact on forests, evaluating the effectiveness of measures for the protection, protection and reproduction of forests, as well as for information support of forest management and the establishment of permissible norms for the withdrawal of forest resources (24). When conducting the state forest inventory, techniques are used, as well as methods of accounting and evaluation of forest resources laid down in the basis of forest taxation. With the use of technologies of forest taxation works on the test areas of GIL, the characteristics of forest plantations are determined: area, breed composition, total and average stock, taxation indicators and others. Quantitative and qualitative characteristics of forests are determined on the basis of 19 statistical data processing of sample areas. The GIL system in Kazakhstan began to take shape with the adoption of the Forest Code of 2006. The formation of the system was preceded by a business trip of specialists of FSUE "Kazlesinforg" to the Czech Republic, according to the results of which it was decided to adopt the model developed by the specified working group based on the materials of the study of the Czech experience as the basis of the introduced working rules of the GIL. Further development and improvement of the GIL system was carried out behind the scenes in the depths of the FSUE "Kazlesinforg". The Republican Forestry Agency did not conduct any scientific research, meetings of the Scientific and Technical Council of the Kazleskhoz, the Ministry of Natural Resources and the Ministry of Agriculture on the development of a GIL model applicable to the conditions of the Republic of Kazakhstan. A very serious strategic mistake was the introduction of GIL throughout the country without its development in pilot regions. The first results of the state forest inventory showed that the principles of grouping (stratification) of forest taxing allotments into relatively homogeneous groups (strata) based on forest management materials, laid down in the basis of the working rules of the GIL (since 2011 methodological guidelines), lead to unreliable results. The updating of forest management materials on economic activity and the impact of natural factors provided for by the composition of the work could not be carried out by decrypting high-resolution aerospace images, since it would require a full-fledged decryption of forests in vast territories. Thus, the introduction into the model of the state forest inventory of algorithms based on the stratification of forest allotments into 20 homogeneous groups (strata) based on forest management materials made the process of forest inventory dependent on the availability of relevant forest management materials, and the tasks of conducting GIL impossible. The existing model of the state forest inventory completely ignores the developed and tested remote methods of forest inventory, previously widely used in the domestic practice of forest survey work (photostat method). Their use would significantly reduce the time of the GIL and the costs of its implementation. In addition, remote methods make it possible to take into account reserve and hard-to-reach forests with minimal costs and acceptable accuracy, where the laying of test areas by random placement is not always possible. The state forest inventory in the Republic of Kazakhstan is entrusted to the republican forest management body, which does not correspond to the principles of separation of powers for the management of natural objects and assessment of the effectiveness of their management generally accepted in world practice. In most cases, national forest inventories are conducted by research organizations that are not involved in forest management processes. It is with this approach that the Institute of State Forest Inventory has gained worldwide recognition and proved its effectiveness in achieving sustainable forest management. Since 2008, the state inventory has covered more than 250 million hectares of forests (25). However, in violation of the republican legislation, information about any results of almost eight years of work in the public space did not appear, including on the Internet. The results of the GIL were not brought to the state authorities, 21 ensuring the formation and implementation of the state forest policy, and regulatory legal regulation of forest relations. In the conditions of an information vacuum about the state of forests in 2012-2013, the Government of the Republic of Kazakhstan adopted the "Fundamentals of state policy in the field of use, protection, protection and reproduction of forests in the Republic of Kazakhstan for the period up to 2050", as well as the state program of the Republic of Kazakhstan "Forestry Development" for 2020-2030. Currently, based on the knowledge about forests acquired in the 80-90 years of the last century, the concept of forest intensification is being developed and approved. The lack of proper accounting of forests has led to the non-fulfillment by the Republic of Kazakhstan of international obligations. Due to the lack of periodic monitoring of the state of forests, the report of the Republic of Kazakhstan at the 7th Ministerial Conference of the "Forests of Europe" process, held on October 20-21, 2015 in Madrid, Spain, provided data taken from the 2011 report. There are no data from Kazakhstan in the analytical materials and diagrams of the general report on the state of forests in Europe. The explanation to the report states that "due to the lack of comparable up-to-date data on the Republic of Kazakhstan, in order to preserve the internal integrity of the report, the information provided by the Republic of Kazakhstan in 2011 is not included in the analytics and charts"

V. ACHNOWLEGEMENTS.

This study was carried out on the basis of a private institution "Higher Multidisciplinary Medical College "Turkestan"", which has a certain room and equipment for conducting research. It is also

necessary to note the high level of involvement of the staff of the college, who have made a significant contribution to the development of this topic. As for the student potential, there were many activists who agreed to take part in the research in various positions listed below. These positions include data and positions from the table below. Thus, as a legal experiment, the research group planned a study with the participation of 16 full-time students in the specialty of nursing. So 8 students participated in an experiment where each of them was given the role of an active stalker and a passive stalker, as well as an active victim and a passive victim. Four students monitored and four students supervised each group of tests.

VI. CONCLUSION.

In conclusion, it can be indicated that the issue of maintaining international obligations in the field of forest policy, adopted and ratified by the Republic of Kazakhstan, is a mandatory measure of international foreign policy relations of the Republic of Kazakhstan, which has certain obligations to disclose some positive dynamics during a certain time period.

VII. RECOMMENDATION.

As a recommendation, more importance should be given to grant financing, since it is the sector of scientific research that has more versatile tools for monitoring, forest design and adaptation of samples of deciduous and coniferous crops to any conditions. The present is, in principle, possible, given the international obligations of the Republic of Kazakhstan, to direct a certain percentage of industrial facilities that they charge for ecology from industrial enterprises to increase the area of forests.

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Impact Factor:					
	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 1.582	РИНЦ (Russia) = 3.939	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 8.771	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2022 **Issue:** 05 **Volume:** 109

Published: 18.05.2022 **http://T-Science.org**

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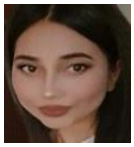

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DIVERSIFIED ASPECTS OF THE USE OF GREEN TECHNOLOGIES IN THE CONSTRUCTION OF CONIFEROUS-DECIDUOUS FOREST FOR ITS SUBSEQUENT TRANSFORMATION INTO A NATIONAL NATURAL PARK

Abstract: *The purpose of this study is to design an alternative application for grant funding for the construction of a unique thematic coniferous-deciduous forest with elements of tropical flora in the vicinity of the village of Beynetkesh of the Pervomaisky district of the Tolebiysky district of the Turkestan region of the Republic of Kazakhstan*

with its further transformation into a national nature park. The present, according to the forecasts of foreign experts from McGill University in Canada, as well as Dublin University in Ireland, should have a sharply positive impact and have a beneficial environmental, economic and social effect not only on the Tolebi district, but also on the entire Turkestan region.

***Key words**: forest, plantings, forest planting, invitro, fertilizers, tourism, forestry, coniferous, deciduous, shrubs, ecology, herbs, flowers, humus, Beynetkesh.*

***Language**: English*

Citation: Shalkharov, Y., et al. (2022). Diversified aspects of the use of green technologies in the construction of coniferous-deciduous forest for its subsequent transformation into a national natural park. *ISJ Theoretical & Applied Science, 05 (109),* 515-525.

Soi: http://s-o-i.org/1.1/TAS-05-109-55 ***Doi***: https://dx.doi.org/10.15863/TAS.2022.05.109.55

***Scopus ASCC**: 1100.*

Introduction

По результатам технического задания грантовского проекта КН МОН РК утвержденного приказом Председателя КН МОН РК от «2» марта 2022 года № 27-нж

Prerequisites for the study of this topic.

The main idea of the study is the structural administration of a unique forest area in the mountainous area of southern Kazakhstan, namely the village of Beynetkesh, Pervomaisky district of Tolebiysky district of Turkestan region, using the methods of interdisciplinary research both in the field of planting, cultivation and placement of objects of green technologies, in which unique combinations of coniferous deciduous and other types of trees would grow in a certain order and progression with types of shrub plants, flower beds and berry crops, the cultivated samples of which represented a certain progression of commercialization of the results of scientific and practical activities, in accordance with which seedlings, sprouts and seeds of trees, bushes, herbs, flowers and other plants would be sold to other regions of the Turkestan region and Kazakhstan as a whole. At the same time, it is also important to note the formation of the basic fauna of the forest area, which would give its charm to the uniqueness of the green infrastructure of the cultivated forest area. In addition, another object of commercialization is the creation of a landscape background for the construction of a boarding house in the ethno-aul style in the future, involving cable cars through picturesque forest areas, yurts and other elements, a combination of traditions and the forest spirit, favorably affecting the emotional and physical condition of vacationers.

№	ИРН	Наименование	Заявитель	Научный руководитель	Период реализации	Группа объектов ГНТЭ	Статус	Готовность	Создать
1	AP09561600	Лесопроектирование: конструкция уникального образца лесного массива по системе in-vitro	Частное учреждение "Шымкентский университет"	Битемиров Кайрат Турлыбаевич	2022 - 2024	Конкурс на грантовое финансирование исследований молодых ученых по проекту «Жас ғалым» на 2022-2024 годы	Создано	100%	Действие

Pic.1

Scientific background of the study

The scientific groundwork for the development of this study was started five years ago in 2015, where Shalkharov E.S., Nartai.A.N., Shalkharov Zh.E., Shalkharova S.E., Shalkharova A.E. and Shalkharova T.E. for the first time proposed issues of legal administration in the issues of forcing forest design, where biological, botanical, zoological entomological and agronomic specialties, together with agricultural specialties, would have been clearly designed using legal techniques, for which it was originally started as a legal project. However, due to the versatility of the present, other specialties were involved in the program, including practical specialists. In addition, the idea of research was influenced by natural factors, under which the number of trees in this area began to decrease, as a result of which fresh grass began to be

burned by solar activity, which led to the beginning of an arid climate in this area.

The novelty of the study.

The present has a direct novelty due to several factors, starting with the adaptation of some species of coniferous and deciduous plants to an environment unusual for them, as well as a sharp improvement in climatic conditions in the region to an attempt to create a self-financed and integrated structural element of the forest. In the past, there have been attempts to explore this area in the literature. So in the Republic of Kazakhstan, the research of Batyrbayev N.M. was devoted to this issue, who in his work justified the need for state support as a factor in improving the environmental situation in Kazakhstan (1). Shalkharov E.S., also proposed in his publication to create a self-financed forest facility that would develop thanks to a clear legal organization (2). Kaldybaev B.A. in his research provided a high probability of an attempt to grow such a forest in southern Kazakhstan in the Tolebi district (3). Kosherbayev E.O., also supported the authors' concept that the mountainous foothill terrain would play the role of an aero pipe that could distribute finacites throughout southern Kazakhstan (4). Nurzhauov A.Sh in his writings also stated the possibility of such in the presence of certain hydraulic installations (5). On the territory of neighboring countries, this issue was studied by a researcher from the Russian Federation, N.S. Volkova, who determined that the southern regions of the country are the most favorable in terms of the organization of the aerial tunnel (6). The economic model of afforestation was proposed by the Ukrainian researcher V.S. Protsenko, who identified the possibility of self-financing segments of natural territories (7). Belarusian studies initiated by V.N. Stepanenko and A.S. Nazarov determined that Kazakhstan, namely Southern Kazakhstan, are the most favorable for growing deciduous trees due to climatic conditions (8). Researchers from neighboring Uzbekistan In the person of Yuldasheva N.N., an alternative to the distribution of cedar species of coniferous trees in southern Kazakhstan was also identified [9]. Nogaichi Ch.A., from neighboring Kyrgyzstan, also identified the possibility of such in the Tolebiysko district of southern Kazakhstan (10). It was on the basis of the works of foreign and national research on the need for planting forests in the Tolebi district of southern Kazakhstan that it was decided to make an attempt to plant a unique thematic forest on the territory of the Pervomaisky district of the village of Beynetkesh in the Turkestan region of the Republic of Kazakhstan, which shows the interconnectedness of literature with research and the program

Compliance with the state national program.

This program developed in this article also corresponds to the strategic direction "Kazakhstan 2050" in accordance with which afforestation and planting is an important task not only to stabilize and improve the ecological background of the country, but also to increase the tourism potential of the region and the country. This can be cited as a strategically important state task, for which it was developed. The applicability of the results of this program also shows a fairly high level due to the versatility of this program, which involves the arrangement of a natural park that has a positive impact on the region, the creation of a specialized nursery of some rare species of coniferous and deciduous trees, the sale of seedlings and sprouts to other regions of Kazakhstan, the creation of a brand of heterogeneous berries for sale in supermarkets in Kazakhstan, as well as the creation of tourist center for camping and ethno-village. Consequently, the importance of the program at the national level can be identified as improving the ecological background of the region and increasing the tourism potential of the region. The importance of the program at the international level is the creation of an international base for tourism with its own beach and channels for mini rafting and diving. In addition, in summer, you can organize a balloon ride. All these are exactly the products that vacationers from other countries need for an effective pastime in the Kazakh nature.

The impact of research on the development of technology.

The results of this study will also have a positive impact on the development of science and technology not only in the field of botany and agriculture, but also in the field of legal technologies, marketing techniques, management and other related specialties. In addition, the interdisciplinary functioning of diverse specialists is a new direction of modern scientific research in this field, which assumes full-fledged cooperation between broad scientific areas and is necessary to achieve the goal of the program due to its wide coverage and poly functionality.

Expected social, economic and environmental impact.

The justification of the expected social, economic and environmental effect assumes in society the mass involvement of the rural population in active activities for the seedlings of the forest through weekly events "Asar", in which the organizers provide food, fun and a work program, and all those who come gather in teams and compete. The present certainly has a positive effect both on the level of traditions and on the education of young people and their inculcation to physical labor. The economic effect can be explained by the end result, which forms a complex of services from tourism to the sale of specific products of rare berry crops. The ecological effect consists in large

amounts of land cultivation and an increase in the number of trees.

The fundamental difference of the idea from the existing analogues.

The fundamental difference between the idea of the program from existing analogues, or competing ideas is the achievability of products and services to the majority of citizens. Of course, in the world and in Kazakhstan there are analogues of both woodlands and forest-steppe massifs. However, the fundamental difference of this forest area will be its thematicity, in accordance with which some areas will be blue, with plantings of blue and blue colors, some areas will be yellow with plantings of yellow and orange colors, some areas will be dark and light green tones. So, visitors will see a range of colors in a certain sequence, compiled in a specialized way according to the psychological parameters of distraction and relaxation of attention. There are no such analogues in the Republic of Kazakhstan. And affordable prices will allow more people to visit this forest annually, which will allow, together with the sale of berries and seedlings, to support the financing of both flora and fauna and forest supervision officers. Thus, it will become a self-financed natural infrastructure that will annually supply seedlings of various types to other regions of Kazakhstan, which is an absolute aspect of the reasons why the project should be funded and why it is beneficial for Kazakhstan.

The final result of the study.

The end result of this program will be a product and service, which, if we note the current state of the art in the subject area of the program, will have the know-how novelty of a combination of berries that are not available on the free market, but which are very useful for health and immunity in general. The state of the art also makes it possible to achieve such, since it has heterogeneous methodological tools.

Hypotheses: primary hypothesis, secondary hypothesis and tertiary hypothesis.

To verify the results of these studies, the authors have proposed some hypotheses.

The primary hypothesis.

In accordance with the primary hypothesis, it can be indicated that the planting of coniferous-deciduous forest on the territory of the Beynetkesh settlement of the Pervomaisky district of the Tolebiysky district of the Turkestan region of the Republic of Kazakhstan with its further transformation into a national natural park will positively affect the ecological situation in the region

Secondary hypothesis.

In accordance with the secondary hypothesis, it can be indicated that the planting of coniferous-deciduous forest on the territory of the Beynetkesh settlement of the Pervomaisky district of the Tolebiysky district of the Turkestan region of the Republic of Kazakhstan with its further transformation into a national natural park will positively affect the economic situation in the region.

The tertiary hypothesis.

In accordance with the tertiary hypothesis, it can be indicated that the planting of coniferous-deciduous forest on the territory of the Beynetkesh settlement of the Pervomaisky district of the Tolebiysky district of the Turkestan region of the Republic of Kazakhstan with its further transformation into a national natural park will positively affect the social situation in the region.

The degree of interconnectedness of hypotheses with research design.

The design of research is supposed to be qualitative with elements of cohort techniques. The present involves a sample of about 5,000 respondents to indicate the will of citizens regarding which of the selected three components is the most acceptable.

LITERATURE REVIEW

Forests and trees, to which we pay tribute on March 21, on the International Day of Forests, are the cornerstone in solving the problems of climate change and ensuring sustainable development. Forests are one of the most important carbon stores on our planet [1]. However, when deforestation is carried out in order to free up areas for agriculture or infrastructure, a huge amount of carbon dioxide and other greenhouse gases are released into the atmosphere, which is one of the factors of climate change [2]. At the same time, forest plantations play a crucial role in mitigating the effects of climate change not only by absorbing greenhouse gases, but also by creating more sustainable landscapes: they regulate the water regime, improve soil conditions and preserve them for agriculture, protect coastal communities from extreme weather events and sea level rise, and create migration corridors for plants and animals [3]. In accordance with the Paris Agreement adopted at the 21st UNFCCC Conference of the Parties (COP21), some countries have made serious commitments within the framework of national climate action plans (the so-called NDC or national contributions) in terms of implementing adaptation measures and reducing greenhouse gas emissions associated with deforestation and forest degradation, climate change the nature of land use and agriculture [4]. In total, these sectors account for almost a quarter of global emissions, but in many developing countries their share is much higher [5]. To implement these national action plans, countries will need many trillions of dollars of investments related to climate and forestry [6]. To achieve the goal of keeping global warming at

no higher than 1.5 degrees Celsius, these commitments should be reflected in investments, including initiatives aimed at improving the sustainability of forests and landscapes [7]. Improving the quality of forest management reduces existing and future vulnerability to climate change, along with achieving mitigation and adaptation goals. The connection of forests with people is no less important [8]. It is estimated that 1.3 billion people - about one fifth of the world's population - directly or indirectly benefit from forests in the form of employment, forest products, as well as sources of livelihood and income [9]. Forests are practically the only source of livelihood for 300-350 million people (about half of them are indigenous peoples) living in or around dense forests. And for hundreds of millions of other people, including urban residents, forest resources are food, building materials and energy sources [10]. In addition, forests contribute to the growth of well-being and employment. It can be assumed that with an increase in demand for forest products, this contribution will increase over the coming decades. More than 13.2 million people work in the official forest sector, more than 5 thousand types of wood products are produced and gross value added exceeding 600 billion US dollars is created annually, i.e. almost 1% of world GDP [11]. An example is three recently completed or ongoing projects supported by the World Bank, which help to understand why financing for the sustainable use of forest resources and activities in support of low-carbon development are more important than ever for the future of forests, for ensuring resilience to climate change and improving the economic situation of people [12]. Another World Bank project aimed at solving forest management problems is being implemented in Kazakhstan, where forests are not only an important source of permanent and seasonal employment for the population of many cities and towns, but also are of great value as a source of fuel wood, pastures for livestock, apiary farms, a territory for picking berries and mushrooms, as well as a place of rest [13]. However, in some areas, the population's access to forests was restricted in order to prevent illegal logging and fight forest fires (the latter is a special problem in the conditions of Kazakhstan's dry climate) [14]. At the same time, the country needs to strengthen the capacity at the national and local levels to take measures to combat fires and other threats. The project "Conservation and Restoration of Forests", funded with the assistance of the World Bank ($30 million) and the Global Environment Facility ($ 5 million), is mainly aimed at improving the environmental protection system on the territory of almost one million hectares, including 46 thousand hectares, through the introduction of collective management methods. renewed pine plantations in the Irtysh floodplain [15]. Thanks to the development of modern methods of forest cultivation, the government has significantly reduced the cost of reforestation, and the use of new-type trucks and modern fire alarm systems has significantly reduced the time of detection of a forest fire and the arrival of fire brigades at the place of ignition. In addition, the project entails important consequences in terms of climate change: the cost of prevented greenhouse gas emissions will amount to USD 306 million over a 20-year period [16]. Forests and forest soils play a large, complex and interactive role in the environment. Millions of years of soil provide the basis for the growth of trees and entire forests. Soils are an essential component of forests and forest ecosystems, as they participate in the regulation of important ecosystem processes – such as nutrient uptake, decomposition and ensuring water balance. Soils give trees the opportunity to take root, moisture and nutrients [17]. In turn, trees, as well as other plants and vegetation cover are an important factor in the formation of new soil in the process of rotting and decomposition of leaves and other vegetation. At the same time, the relationship between soils and forests is much broader and more complex. Soils and forests are inextricably linked, their impact on each other and the environment is enormous [18]. Interactions between forests and forest soils contribute to the maintenance of ecological conditions necessary for agricultural production [19]. The positive effects of these interactions are very multifaceted and ultimately contribute to the creation of a productive food system, strengthening the livelihoods of rural populations and environmental health in the face of changes [20]. Forests, forest soils and their interactions perform the most important functions, contributing to ensuring food security and environmental health [21].

- Climate change: the role of forests and forest soils. Carbon emissions are one of the significant factors of climate change [22]. One of the many roles that the forests of our planet play is that they act as a repository of significant carbon reserves [23]. Forests account for 650 billion tons of carbon, or almost a third of its total volume in terrestrial ecosystems. Forest soils contain about the same amount of carbon as the forest biomass of the whole world (about 45% each) [24]. The remaining ten percent of carbon is accounted for by forest deadwood and forest litter [25]. In total, forests store the same amount of carbon as the atmosphere.

- Rational use of soil resources requires rational use of forest resources, including their restoration [26]. The planet needs rational use of forest resources in order to combat erosion and preserve soils [27]. Tree roots stabilize ridges, hills and mountain slopes and provide the soil with the necessary mechanical structural support to prevent surface movements of continental massifs: landslides rarely occur in places of dense forest cover [28]. Rational forest management methods, including measures to create or preserve forest cover on soils subject to erosion and in

surface runoff channels, will help to control or reduce the risks of soil erosion and small landslides [29]. Reforestation in arid areas is vital for soil protection.

- Benefits of forests and soils for ecosystems: clean water and water management in the catchment area. By reducing the risk of soil erosion and threats of landslides and avalanches, the rational use of forest resources significantly contributes to the functioning of systems responsible for maintaining clean water reserves on the planet, as well as a balanced water cycle [30]. In addition, forests are one of the main components of water management in watersheds – an integrated approach to the use of natural resources in the geographical region of the watershed [31]. Water management in the catchment area is a very environmentally friendly way to protect and restore areas prone to soil degradation and erosion in high-altitude areas. One of the key parameters taken into account when planning measures to regulate runoff from the catchment area are the characteristics of the forest and soil [32]. In addition, measures to restore and improve soil fertility - for example, through reforestation - have many advantages and are therefore an integral element of any water management plan in the catchment area.

- Soil conservation in semi-arid and arid regions begins with forests and trees. Forests play a crucial role in protecting soil resources by preventing soil erosion, for example, they help prevent or reduce salinization [33]. In semi-arid regions, the problem of forests is to find the optimal combination of water recovery and soil protection.

- Forests can reduce the sensitivity of mountain soils to degradation. Due to the steepness of the slopes and the thinness of the soil layer, mountain ecosystems are extremely vulnerable to erosion. Mountain soils are often degraded and obviously do not provide plants with a sufficient amount of nutrients for good growth [34]. According to FAO estimates, about 45 percent of the world's mountain regions are unsuitable or only marginally suitable for agriculture. Degradation of mountain soils and vegetation cover can occur both gradually and quickly, but their restoration often takes many years, and in some cases these processes are irreversible [35]. Farmers living in mountainous areas have many problems: these are short growing seasons, steep slopes, shallow soils, and the likelihood of landslides [36]. In order to survive, they had to invent numerous ways to prevent or distribute risks using complex and diversified farming systems on arable land, pastures and forests [37]. Farmers know that they must use different types of soil competently at different heights and at different times of the year [38]. In order to protect our soils, it is necessary to protect forests and trees [39].

In the past, the importance of such consequences was often ignored, and this led to the cutting down of tree and shrub vegetation with the subsequent loss of millions of hectares of fertile land [40]. Moreover, since forests are still being cut down, as a result of which the land is directly affected by wind and rain, soil erosion and land degradation continue to undermine the resource base of agriculture. Therefore, to protect our soils, it is necessary to protect forests and trees. Both of these vital resources play a central role in ensuring food security and environmental health. In addition, this study involves the use of many elements from the field of artificial intelligence, problems of biological safety, problems of supporting many psychological interventions such as stalking and others, issues of genomic research, as well as issues of medical rehabilitation [41, 42, 43, 44, 45, 46, 47, 48, 49].

RESEARCH METHODOLOGY

As a formulation of the clarity of the scientific research question, it is possible to identify the question according to which the interdisciplinary norms of rational monitoring of green technologies through applied forest design will positively affect the environmental, economic and social situation in the region. This formulation clearly reflects the purpose, question, assumptions and hypotheses of the research plan, justifying their degree of scientific character systematically and systematically. To answer this question, an attempt was made to substantiate the present with the help of three hypotheses, the realism of which is associated with the purpose and expected results of the research plan. The primary hypothesis suggests that interdisciplinary norms of rational monitoring of green technologies through applied forest design positively affect the ecological situation in the region, since a large number of deciduous trees emit a sufficiently large amount of oxygen, a large number of coniferous trees, a large number of phytantsites, and mountain air is an excellent aerodynamic tunnel for correct propagation. The secondary hypothesis suggests that interdisciplinary norms of rational monitoring of green technologies through applied forest design positively affect the economic situation in the region, since in the future nearby villages will be able to collect and sell berries such as blackberries, raspberries, blueberries, lingonberries, blueberries, sea buckthorn, as well as nuts, mulberries and pine nuts, not counting the organization of tourist centers and shops where tourists can shop. The tertiary hypothesis suggests that interdisciplinary norms of rational monitoring of green technologies through applied forest design have a positive impact on the social situation in the region, since the present will immediately provide a large number of jobs, organize the infrastructure of service personnel and other favorable changes for the region. To prove the hypotheses, an attempt was made to substantiate them with the help of research strategies and approaches that suggest using descriptive, correlation, and experimental studies in the program,

depending on the periodicity of tasks, the sequence of which varies depending on a particular stage of the program implementation. The study has a clear systematic achievement of the set goal through concrete actions for a systematic transition from one task to another. In addition to a certain periodicity, the present also illustrates the compliance of resources, deadlines and the content of the work performed with the goals, objectives, methodology and expected results of the study. As a research strategy, such can be designated by virtue of the use of one methodological tool in one task, the use of other techniques in the second and the use of other techniques in the third task. The research approaches in the study are experimental in nature, where participants try various kinds of methodological tools in accordance with the results obtained. A number of approaches have been developed, indicated in this section, to which sequences will be determined. These approaches in the framework of the research plan include experiments that are completely new and have not been used in such studies before. Due to the urgency of the need for such an experiment, it can be considered quite modern. All experiments are planned with a certain frequency and systematics encoded in a certain algorithm, which justifies the correctness of the planning of experiments for its subsequent statistical data processing.

2) It is also possible to briefly describe the most important experiments that will be carried out around certain deciduous and coniferous trees, shrubs, flowers and grasses, the adaptation of which will be carried out with their division into specialized groups that will be treated with different types of fertilizers and concentrates. In addition, purchased animals and birds are also subject to experiments, which will adapt to the region gradually. So, the present provides for the work of a specialized specialist who will be engaged in the adaptation of these species to the region. Protection issues will also be assigned to the breed of Carpathian wolves (Czech Vlchak), which is a relative of the modern wolf, but easily tamed by humans and which, on a full stomach, will not only give the appearance of the inhabitants of the local forest, but also protect the local fauna from stray dogs, other wolves, cats and jackals. The experiment will be aimed at as much as possible. Thus, the experiments cover both flora and fauna objects, observations of biometric indicators of which are compared in time progression. These experiments as scientific methods and approaches, like all others, directly correspond to the goals, objectives, hypotheses and expected results of the program. At the same time, the data of visual and internal characteristics will be recorded weekly both in centimeters, oxygen and other indicators of plants, and in the nature of animals, which in a certain progression will show the reliability of the collection of initial data and their sources. This collection method is consistent and associated with the research question and proves the validity of the methods used in the study.

3) Methodologically, this study assumes an abundance of methodology of several sciences, ranging from legal and ending with forestry and biological, depending on the stages, specifics and nature of the work. This is exactly what is an indicator of the possibility to achieve breakthrough scientific and scientific and technical results due to the uniqueness of the interdisciplinary system, which involves creating the foundations for solving environmental problems, improving the environmental situation, based on environmentally friendly safe technologies. Since the project assumes a symbiosis of administration and execution of such, to begin with, the use of three types of methodological tools appears: externally descriptive, internally detailed and statistically correlative. All three methodological tools are innovations and solve methodologically problematic areas.

1. An externally descriptive tool involves the use of four types of design of research results. The justification of this scientific method is the need to use a descriptive tool of the information array in the project. It is interrelated with the first task related to the processing of literary data. It includes cluster systematization, two-dimensional design of the reflection of tasks and the catalyzation of literary data by a legal element.

1.1. Cluster systematization of the information array. This methodological tool involves grouping semantic blocks in the text by the order of transition from a larger variable to a smaller one. It is necessary in the study, as it helps to fix the transition from the general meaning to the result under study. Deduction, induction, and abstraction can also be included in this group.

1.2. Two-dimensional design of task reflection. Assumes a visual analysis of the results of the answered tasks. Each section responds to one specific task. In accordance with this analysis, it is possible to observe the total addition of the results of tasks to achieve a common goal, and it is possible to notice the gradual achievement of the goal from one task to another.

1.3. The catalyzation of literary data by a legal element. Allows you to notice the adaptability of the literature used to the studied territorial space or population.

2. An internally detailed methodological tool justifies a number of certain scientific and legal methods, the purpose of which is a detailed analysis of elements with a vector accentuation of key nuances. It is interrelated with the second task related to the analysis of actions, omissions and responsibility. Assumes the presence of certain methods:

2.1. Multidimensional subjective analysis. Allows you to conduct a subjective analysis of each of the variables for strengths.

2.2. The Lawrence and Wilson pyramid for the identification of obligations. Assumes the analysis of variables by means of a simple formula.

2.3. The Mason Awns scale for the analysis of rights and obligations. A scientific tool that identifies parameters along a logical chain.

2.4. The system of distribution of comparations.

3. Statistical correlation research is justified by an assessment of the interrelationships between several factors, called variables, which are not controlled by the researcher, and which, in turn, is aimed at establishing changes in one variable when another changes or influences it. Data processing is assumed using the SPSS program, which will give greater validity to the results of the study, the reliability of which is determined by demonstrating consistency between the research question and data collection methods. The joint systematic application of the above methods makes it possible to achieve the specified research goal in order to achieve the expected results, including with regard to forecasting the consequences of the results of the implementation of scientific, scientific-technical and innovative projects, scientific-technical, socio-economic, environmental consequences of the implementation of which will be issued in the form of a specialized educational publication "symbiotics of diverse methodological mechanisms in one project".

RESULTS & DISCUSSION

The expected results of the study fully correspond to the state program for research work "Development of scientific foundations for the conservation and improvement of the stability of forest ecosystems in the regions of Kazakhstan" In the relationship, the results provide a comprehensive solution that provides for the impact on all aspects of a strategically important state task, the purpose of which is to develop scientific foundations for the conservation and improvement of the stability of forest ecosystems in the regions of Kazakhstan, which, in order to fulfill the tasks, involves the development of ways to preserve and increase the stability of natural forest ecosystems, biodiversity of rare and economically valuable species, taking into account the regional characteristics of Kazakhstan; the development of scientific foundations for increasing the stability and durability of forest plantations of the green zone in the village of Beynetkesh; creation of a database of valuable genotypes of scots pine with the use of rapid assessment technology for obtaining varietal and improved seeds, as well as the development of scientifically sound standards for annual loads and the need for equipment for forestry in Northern and Eastern Kazakhstan. The present assumes, at the end of the program, the registration of 2 applications for a utility model according to the method of identifying the degree of bitterness of plantings in the green zone in the village of Beynetkesh by comparison with the region in the village of Beynetkesh, the method of determining the criteria for quantitative and qualitative indicators of forest crops of the kulis type of green zone in the village of Beynetkesh by comparison with the region in the village of Beynetkesh.Beynetkesh", 10 recommendations for improving sustainability, restoration of tugai forests and afforestation in the southern regions of Kazakhstan, the system of forestry and forestry measures for forestry in floodplain forests in order to prevent shallowing and increase the catchment area in the floodplain of the Ural River, to strengthen the water protection and protective properties of plantings in the zone of dark coniferous forests of the Rudny Altai by comparison with the region in the village "Beynetkesh", the method of microclonal reproduction of 1-2 forest tree and shrub species; methods of conservation, restoration and reconstruction of weakened and dying plantings in the green zone of the village of Beynetkesh, by comparison with the region in the village of Beynetkesh, the transfer of forest crops in the green zone of the village of Beynetkesh to forested lands, by comparison with the region in the village of Beynetkesh, the normative survival of tree and shrub species in the green zone of the village of Beynetkesh, by comparing with the region in the village of "Beynetkesh", increasing the durability of forest plantations of the green zone of the village of Beynetkesh on the basis of forestry measures (logging care), by comparison with the region in the village of Beynetkesh, protection of the green zone of the village of Beynetkesh from harmful insects based on forest pathology monitoring and the use of low-toxic insecticides, by comparison with the region in the village of Beynetkesh, scientifically based standards of annual loads and the need for equipment for forestry in Northern and Eastern Kazakhstan, by comparison with the region in village "Beynetkesh", 1 database of valuable genotypes of plus trees of scots pine for Northern Kazakhstan. As a final result, it is possible to designate an increase in the area of forested land in the regions of Kazakhstan due to new effective developed methods and technologies; the development of biological pest control methods that will reduce the drying of plantings by 10-15% and increase the growth of wood by 5-10%, which will save the cost of forest protection measures by 20%, reduce financial and labor costs when using the invitro breeding method in order to preserve forest species and obtain healthy planting material, annual loading standards and the need for the equipment will reduce labor and material costs when performing forestry work in the forestry industry by 1.5 times. The scientific effect will consist in the development of new methods of microclonal reproduction of 1-2 tree and shrub species of Kazakhstan; for artificial forest plantations of the green zone of the village of Beynetkesh - in comprehensive protection against

pests and diseases, assessment of plant growth conditions using nutrition diagnostics and resistance of certain tree species to soil salinization, the mechanism of transfer of forest crops to forested lands, in the development of standards for the survival of tree and shrub species and forestry methods to increase the stability of plantations. The target consumers of the results are: specially protected natural territories, state forestry institutions, forest breeding centers, landscaping and design organizations, entrepreneurs. Thus, the results of this project increase the qualitative and quantitative characteristics of the implementation of the greening of the country. The present fully corresponds to the goals and objectives of the program

CONCLUSION & RECOMMENDATIONS

As a conclusion and recommendation, it should be noted that for the Republic of Kazakhstan, namely for the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan, it is quite expedient to approve an application for grant funding regarding the mass planting of coniferous-deciduous forest on the territory of the village of Beynetkesh of the Pervomaisky district of the Tolebiy district of the Turkestan region of the Republic of Kazakhstan with its further transformation into a national natural park. At the same time, it is important to note that the present will have a positive environmental, economic and social effect not only on the Tolebi district, but also on the entire Turkestan region.

ACKNOWLEGEMENTS.

This study was carried out on the basis of a private institution "Higher Multidisciplinary Medical College "Turkestan"", which has a certain room and equipment for conducting research. It is also necessary to note the high level of involvement of the staff of the college, who have made a significant contribution to the development of this topic. As for the student potential, there were many activists who agreed to take part in the research in various positions listed below. These positions include data and positions from the table below. Thus, as a legal experiment, the research group planned a study with the participation of 16 full-time students in the specialty of nursing. So 8 students participated in an experiment where each of them was given the role of an active stalker and a passive stalker, as well as an active victim and a passive victim. Four students monitored and four students supervised each group of tests.

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Impact Factor:					
	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 1.582	РИНЦ (Russia) = 3.939	PIF (India) = 1.940
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	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2022 **Issue:** 05 **Volume:** 109

Published: 20.05.2022 **http://T-Science.org**

Issue Article

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THE ECONOMIC EFFECTIVENESS AND IMPORTANCE OF THE SYSTEM OF CLUSTERS IN AGRICULTURE IN UZBEKISTAN

Abstract: *Uzbekistan is an agrarian-industrial republic. The importance of agriculture in the country's economy is enormous. Because it accounts for one third of the country's GDP, almost all of the food. More than half of the total foreign exchange earnings at the national level are accounted for by exports of agricultural products. Now the growth of the processing industry, population growth, changes in foreign market demand objectively require the further development of agricultural production processes that meet environmental requirements. Therefore, it is necessary to develop the network and increase its efficiency.*

To develop agriculture at the level required by the laws of a market economy and to introduce scientific and technical achievements, new techniques, innovative technologies into production, clearly define the ways of full and efficient use of limited land and water resources, fixed and variable capital and labor resources in the short and long term and save all costs; it is expedient to identify ways to increase the amount of profit on the basis of improving labor productivity and improving the system of incentives for employees.

Key words: *agriculture, farmer, cluster, finance, credit, subsidy, innovative technology, modern technology, water-saving technologies, agrology, production, raw materials.*

Language: *English*

Citation: Khozhalepesov, P. Z. (2022). The economic effectiveness and importance of the system of clusters in agriculture in Uzbekistan. *ISJ Theoretical & Applied Science, 05 (109),* 526-528.

Soi: http://s-o-i.org/1.1/TAS-05-109-56 ***Doi***: crossref https://dx.doi.org/10.15863/TAS.2022.05.109.56

Scopus ASCC: *2000.*

Introduction

The Development Strategy for 2022-2026, adopted by the President of the Republic of Uzbekistan, is implemented on the basis of the state program for each year in order to increase production using innovative technologies in agricultural development.

Over the next five years, the country aims to increase productivity by at least two times; deeply process raw materials; increase exports to $ 7 billion, and further increase employment and incomes.

The above-mentioned system will pave the way for big changes in the near future. For example, in cotton growing, the processing of fiber has increased 2.5 times to 100%, adding value to production.

In addition, the production of yarn increased by 2 times, the finished product - by 3 times. Exports will reach 3 billion by the end of the year. dollars. 101 new enterprises worth 2 billion and 150,000 new jobs are being created in the stages from cotton to finished products.

More than 5,000 high-performance techniques were brought in by the clusters. Water-saving technologies have been introduced on 126,000 hectares. As a result of the innovative approach, productivity is also increasing. Many clusters intend to harvest 35-40 quintals of cotton this year.

To this end, it is necessary to expand clusters to increase efficiency in the agricultural and agro-industrial industry of the country.

According to the development program of the Republic, the progress of agricultural reforms, the problems facing the clusters and their solutions are being considered. For this, first of all, it is necessary to be interested, that is, to be interested in the cluster and our people. Our population will be provided with new jobs and in general all sectors will be transferred to clusters.

To do this, we need a new reform, a new variety, a new idea, a new direction and science. Allocations from the Agricultural Fund are being increased from the current 60% to 80% of production, and for the final settlement it is planned to allocate budget compensation for the percentage of loans that the cluster receives above the Central Bank rate.

It is planned to repay the loans received by the cluster after processing the raw materials into yarn and fabric. 10 trillion soums will be allocated from the budget for the introduction of this system. Therefore, an additional $ 100 million will be allocated to the Agricultural Fund by the end of the year to increase it from 60 to 80. The biggest issue is the implementation of agro-technical measures to increase soil fertility and productivity on 1 million hectares of cotton fields attached to the cluster.

Transition to new irrigation technologies in agriculture, introduction of plant protection services in new directions. Construction of modern laboratories. Financial grants of 1 million soums per hectare and 1 trillion soums from the total budget are allocated for such activities as training of farmers.

In the next two years, we need to increase the cluster's deep processing of yarn from the current 50 percent to 70 percent, and our GDP growth in terms of GDP will not increase by 10 percent each year from next year, but in the next five years. Another $ 150 million will be allocated for lending to the projects. As a result, budgets, jobs and incomes are expected to increase.

The main problem is the old funding regime, which does not meet the requirements of students for the development of this sector, and now the issue of extending the loan period to cotton and textile clusters by 11 months and increasing the amount.

It needs at least 24 months to grow and process cotton. The preparation of land for planting begins in October, and the allocation of credit for it falls in January- February. From now on, this old system is expected to be completely replaced.

The financing period for the cotton harvest begins in October. From now on, loans to clusters will be allocated for a period of 24 months, and its grace period will be extended from 11 to 18 months.

The government will open a new $ 100 million credit line at low rates to support the export of dyed fabrics and finished products. For clusters and other textile enterprises exporting at least 80 percent of such goods, the social tax rate is set at 1 percent instead of the current 12 percent for a period of 3 years. They will also be given the opportunity to pay property taxes with a 3-year delay.

As a result, enterprises will have at least 500 billion soums a year. Another convenience is that next year, clusters processing yarn will be mortgaged to obtain raw cotton and fiber.

It is necessary to further strengthen the legal guarantees of cluster activity. It is known that in the cultivation and sale of grain are shifting to market relations. In agriculture, grain clusters and farmers are expected to be given the right to sell wheat freely at market prices next year. At the same time, clusters and farms are required to put two and a half tons of grain per hectare on the stock exchange for 3 years. The right to sell the remaining crop directly is given.

Grain processing enterprises of “Uzdonmahsulot” will be put up for auction to form grain clusters.

Measures are being developed to create additional opportunities for fruit and vegetable clusters and cooperatives. They will also be provided with soft loans through the Agricultural Fund and preferential credit resources of 10% for a period of 1 year at the expense of the Fund for working capital in fruit and vegetable clusters.

From the next year, a tender is expected to be held among insurance companies to insure fruits and vegetables. Clusters and farmers with export contracts will receive 50% of the insurance premium from the state. It is planned to reduce the area of low-yielding cotton and grain crops by 200,000 hectares in the country. These areas will be leased to the population on a long-term basis on a competitive basis. It is planned to pay special attention to needy families, teach them the secrets of farming and help them.

In addition, loans for fruit and vegetable projects up to 100 million soums will be provided under the "Every Family is an Entrepreneur" program. The Ministry of Agriculture plans to provide infrastructure for fruit and vegetable clusters and processing enterprises, and to establish agro-logistics centers on the basis of public-private partnerships.

Particular attention is paid to the modernization of agricultural machinery. In order to support farmers and clusters in this regard, starting next year, more than 10% of loans for the purchase of equipment will be covered by the state. Moreover, imported equipment, components and spare parts will be exempt from customs duties for a period of 3 years. As a result, clusters and farmers will be able to purchase machinery up to 35 percent cheaper.

Benefits will also be provided for laser leveling, planting new varieties of crops and disease-resistant, seed development, application of water-saving technologies. In general, a total of 25 trillion soums a year is expected to be allocated for these purposes.

At present, agricultural clusters in Uzbekistan are concluding cooperation agreements with companies from the United Kingdom, New Zealand and Israel. In the next 5 years, it is planned to introduce drip irrigation technologies based on the full digitization of our farmers' lands and innovative technologies.

Today, cotton textile clusters are the locomotive of agriculture. They not only increase productivity, but also increase the income of our people, while at the same time bringing innovations to agriculture.

Because cotton clusters cover a full cycle, they go into a full cycle of financing. Funding for agriculture will be timely. In addition, grants totaling 1 million soums per hectare will be provided for a total of 1 trillion soums. These grants will be used to train farmers to introduce innovations.

From the next year, our farmers and clusters will sell grain grown in the grain system at a free market price, and at the same time a new intervention system will be introduced. At the same time, the same fund will purchase at least 2.5 million tons of grain a year at market prices, and the second is to privatize the state joint-stock company "Uzdonmahsulot" and transfer it to the cluster system. The third direction is fruit and vegetable growing.

Financing of fruit and vegetable growing in the same way as cotton and grain, for example, the opening of funds from the fund and working capital of at least 2 trillion, as well as separate allocations to agro-logistics centers next year are considered to be very important, and another initiative: if our fruit and vegetable products are severely damaged, a new system of insurance will be introduced.

Cotton weaving clusters did not exist in Karakalpakstan almost 3 years ago. The number of cotton weaving clusters newly established 2-2.5 years ago has now reached 10. This year alone, a total of 33 clusters have been established in Karakalpakstan, including cotton, textiles, grain, rice and fruit and vegetables, bringing the total number of clusters in Karakalpakstan to 82. Due to the introduction of water-saving technologies, the involvement of science and laboratories, training of farmers, subsidies of 1 million soums per hectare for cotton weaving clusters.

The clusters give an opportunity to sell wheat grown at desirable, free market prices. So this is definitely a great opportunity for our clusters, our grain farmers. At the same time, each grain cluster was given the right to trade 2.5 tons of grain per hectare per year for 3 years. This, of course, contributes to the price of bread in the domestic market, to a lesser extent food security. For fruit and vegetable clusters, it is planned to allocate credit resources from the fund at a rate of not more than 10% for 1 year, instead of the current 20-24% commercial loans.

This is surely an important direction for Karakalpakstan. It is necessary to accelerate the organization of work in this area and plan to further expand the introduction of direct water-saving technologies. It is necessary to develop plans for the allocation of land to families included in the "Iron Book", "Women's Book", "Youth Book" of the Republic. Plans should be made for the development of additional lands and water-saving technologies should be introduced. The main goal of all this is to improve the living standards of the population and increase the income of our farmers and collectors.

In the regions of the country, the death rate of modern agricultural machinery 5 years ago was 6-7%, today this figure is more than 50%. Our big task is to create a business and economic environment and thereby create jobs, income, raw materials, processing products, employment of needy families, as well as contribute to a sharp increase in efficiency in agriculture.

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Impact Factor:						
	ISRA (India)	= **6.317**	**SIS** (USA)	= **0.912**	**ICV** (Poland)	= **6.630**
	ISI (Dubai, UAE)	= **1.582**	**РИНЦ** (Russia)	= **3.939**	**PIF** (India)	= **1.940**
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	JIF	= **1.500**	**SJIF** (Morocco)	= **7.184**	**OAJI** (USA)	= **0.350**

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2022 **Issue:** 05 **Volume:** 109

Published: 21.05.2022 **http://T-Science.org**

Issue **Article**

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REFERENCE DATA OF PRESSURE DISTRIBUTION ON THE SURFACES OF AIRFOILS HAVING THE NAMES BEGINNING WITH THE LETTER H (THE SECOND PART)

Abstract: *The results of the computer calculation of air flow around the airfoils having the names beginning with the letter H (continuation) are presented in the article. The contours of pressure distribution on the surfaces of the airfoils at the angles of attack of 0, 15 and -15 degrees in conditions of the subsonic airplane flight speed were obtained.*

Key words: *the airfoil, the angle of attack, pressure, the surface.*
Language: *English*

Citation: Chemezov, D., et al. (2022). Reference data of pressure distribution on the surfaces of airfoils having the names beginning with the letter H (the second part). *ISJ Theoretical & Applied Science, 05 (109)*, 529-586.
Soi: http://s-o-i.org/1.1/TAS-05-109-57 ***Doi***: https://dx.doi.org/10.15863/TAS.2022.05.109.57
Scopus ASCC: *1507.*

Introduction

Creating reference materials that determine the most accurate pressure distribution on the airfoils surfaces is an actual task of the airplane aerodynamics.

Materials and methods

The study of air flow around the airfoils was carried out in a two-dimensional formulation by means of the computer calculation in the *Comsol Multiphysics* program. The airfoils in the cross section were taken as objects of research [1-22]. In this work, the airfoils having the names beginning with the letter *H* were adopted. Air flow around the airfoils was carried out at the angles of attack (α) of 0, 15 and -15 degrees. Flight speed of the airplane in each case was subsonic. The airplane flight in the atmosphere was carried out under normal weather conditions. The geometric characteristics of the studied airfoils are presented in the Table 1. The geometric shapes of the airfoils in the cross section are presented in the Table 2.

Table 1. The geometric characteristics of the airfoils.

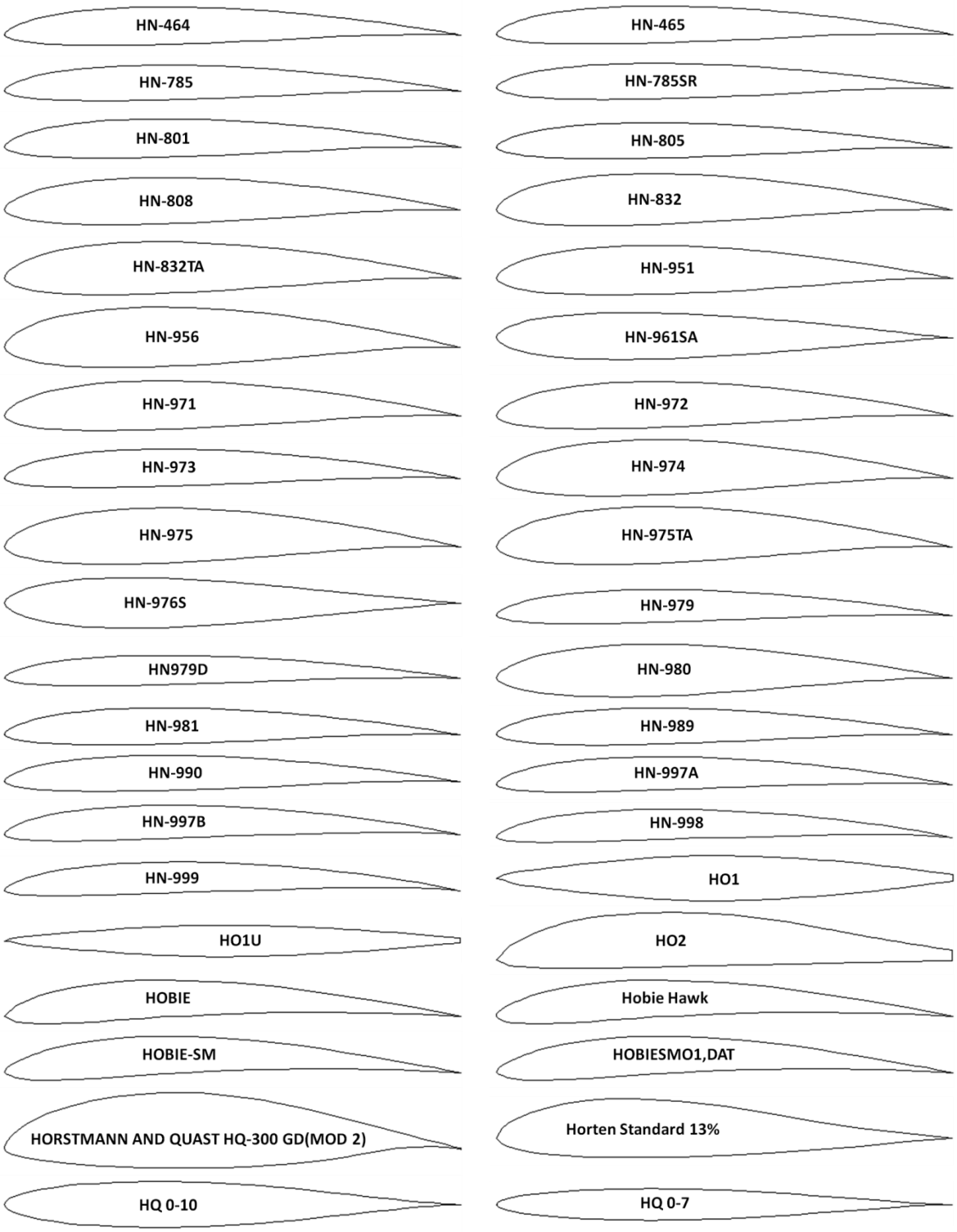
Airfoil name	Max. thickness	Max. camber	Leading edge radius	Trailing edge thickness
HN-464	8.35% at 31.6% of the chord	2.05% at 46.9% of the chord	0.5054%	0.0%
HN-465	8.35% at 31.6% of the chord	2.25% at 46.9% of the chord	0.5045%	0.0%
HN-785	7.85% at 31.6% of the chord	1.88% at 43.7% of the chord	0.4615%	0.0%
HN-785SR	7.85% at 31.6% of the chord	1.48% at 43.7% of the chord	0.4689%	0.0%
HN-801	8.5% at 31.6% of the chord	2.0% at 43.7% of the chord	0.5281%	0.0%
HN-805	7.85% at 31.6% of the chord	1.55% at 43.7% of the chord	0.4683%	0.0%
HN-808	10.32% at 31.6% of the chord	2.02% at 46.9% of the chord	0.7338%	0.0%
HN-832	11.35% at 28.7% of the chord	2.36% at 46.9% of the chord	0.8957%	0.0%
HN-832TA	11.55% at 28.7% of the chord	2.4% at 46.9% of the chord	0.9268%	0.0%
HN-951	10.85% at 31.6% of the chord	1.85% at 43.7% of the chord	0.8189%	0.0%
HN-956	13.14% at 31.6% of the chord	2.3% at 46.9% of the chord	1.0373%	0.0%
HN-961SA	10.15% at 28.7% of the chord	0.35% at 46.9% of the chord	0.8637%	0.0%
HN-971	10.85% at 28.7% of the chord	2.38% at 43.7% of the chord	0.8537%	0.0%
HN-972	10.25% at 28.7% of the chord	2.48% at 43.7% of the chord	0.7676%	0.0%
HN-973	8.33% at 31.6% of the chord	2.38% at 43.7% of the chord	0.5249%	0.0%
HN-974	12.32% at 31.6% of the chord	2.43% at 46.9% of the chord	0.8802%	0.0%
HN-975	12.32% at 31.6% of the chord	2.55% at 46.9% of the chord	0.8894%	0.0%
HN-975TA	12.55% at 31.6% of the chord	2.65% at 46.9% of the chord	0.9099%	0.0%
HN-976S	11.19% at 25.9% of the chord	0.0% at 0.0% of the chord	0.8307%	0.0%
HN-979	7.52% at 28.7% of the chord	2.14% at 46.9% of the chord	0.4512%	0.0%
HN979D	6.55% at 28.7% of the chord	1.75% at 46.9% of the chord	0.3764%	0.0%
HN-980	11.54% at 31.6% of the chord	1.74% at 46.9% of the chord	0.7783%	0.0%
HN-981	8.05% at 31.6% of the chord	1.88% at 46.9% of the chord	0.475%	0.0%
HN-989	8.04% at 28.7% of the chord	1.85% at 46.9% of the chord	0.4586%	0.0%
HN-990	7.85% at 31.6% of the chord	1.88% at 43.7% of the chord	0.4713%	0.0%
HN-997A	7.52% at 28.7% of the chord	2.52% at 46.9% of the chord	0.4495%	0.0%
HN-997B	7.52% at 28.7% of the chord	2.85% at 46.9% of the chord	0.4481%	0.0%
HN-998	6.87% at 28.7% of the chord	2.97% at 46.9% of the chord	0.387%	0.0%
HN-999	7.05% at 31.6% of the chord	3.03% at 46.9% of the chord	0.3908%	0.0%
HO1	9.99% at 47.3% of the chord	0.13% at 1.3% of the chord	2.4387%	1.65%
HO1U	7.0% at 47.3% of the chord	0.13% at 1.3% of the chord	2.4695%	1.156%
HO2	12.0% at 34.3% of the chord	4.38% at 42.9% of the chord	3.2328%	2.432%
HOBIE	8.49% at 25.0% of the chord	3.96% at 45.0% of the chord	1.5473%	0.0%
Hobie Hawk	8.49% at 25.0% of the chord	3.96% at 45.0% of the chord	0.4767%	0.0%
HOBIE-SM	8.57% at 25.0% of the chord	3.98% at 45.0% of the chord	0.7412%	0.0%
HOBIESMO1,DAT	8.57% at 25.0% of the chord	3.98% at 45.0% of the chord	0.7412%	0.0%
HORSTMANN AND QUAST HQ-300 GD(MOD 2)	16.58% at 37.1% of the chord	3.74% at 37.1% of the chord	1.2756%	0.3575%
Horten Standard 13%	13.0% at 30.0% of the chord	2.14% at 30.0% of the chord	1.2823%	0.0%
HQ 0-10	10.0% at 33.9% of the chord	0.0% at 0.0% of the chord	0.6487%	0.0%
HQ 0-7	7.0% at 33.9% of the chord	0.0% at 0.0% of the chord	0.4051%	0.0%
HQ 0-9	8.11% at 33.9% of the chord	0.0% at 0.0% of the chord	0.4787%	0.0%
HQ 1,0-10	9.96% at 35.0% of the chord	1.0% at 50.0% of the chord	0.5002%	0.0%
HQ 1,0-12	11.96% at 35.0% of the chord	1.0% at 50.0% of the chord	0.7389%	0.0%
HQ 1,0-8	7.97% at 35.0% of the chord	1.0% at 50.0% of the chord	0.3215%	0.0%

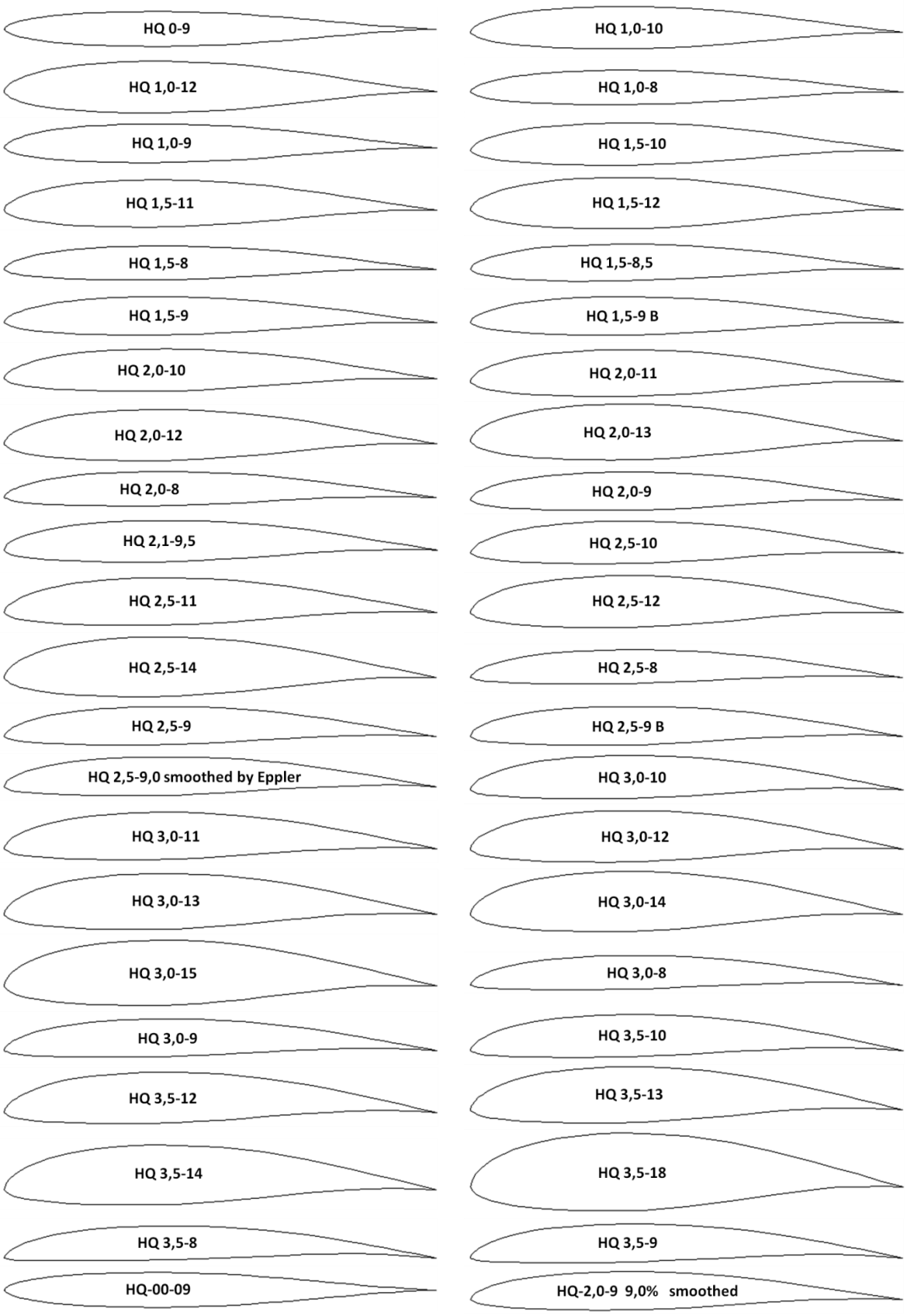
HQ 1,0-9	8.98% at 35.0% of the chord	1.0% at 50.0% of the chord	0.4044%	0.0%
HQ 1,5-10	9.96% at 35.0% of the chord	1.5% at 50.0% of the chord	0.5144%	0.0%
HQ 1,5-11	11.0% at 33.9% of the chord	1.5% at 50.0% of the chord	0.8289%	0.0%
HQ 1,5-12	11.96% at 35.0% of the chord	1.5% at 50.0% of the chord	0.7783%	0.0%
HQ 1,5-8	7.96% at 32.5% of the chord	1.49% at 50.0% of the chord	0.3262%	0.0%
HQ 1,5-8,5	8.56% at 35.0% of the chord	1.5% at 50.0% of the chord	0.3939%	0.0%
HQ 1,5-9	8.97% at 35.0% of the chord	1.5% at 50.0% of the chord	0.413%	0.0%
HQ 1,5-9 B	8.95% at 37.1% of the chord	1.5% at 50.0% of the chord	0.3622%	0.0%
HQ 2,0-10	9.97% at 35.0% of the chord	2.0% at 50.0% of the chord	0.5145%	0.0%
HQ 2,0-11	10.97% at 35.0% of the chord	2.0% at 45.0% of the chord	0.628%	0.0%
HQ 2,0-12	11.97% at 35.0% of the chord	1.99% at 50.0% of the chord	0.7652%	0.0%
HQ 2,0-13	12.96% at 35.0% of the chord	2.0% at 50.0% of the chord	0.8939%	0.0%
HQ 2,0-8	7.98% at 35.0% of the chord	1.99% at 50.0% of the chord	0.33%	0.0%
HQ 2,0-9	8.97% at 35.0% of the chord	1.99% at 50.0% of the chord	0.4164%	0.0%
HQ 2,1-9,5	9.49% at 35.0% of the chord	2.1% at 55.0% of the chord	0.6756%	0.001%
HQ 2,5-10	9.96% at 35.0% of the chord	2.5% at 50.0% of the chord	0.4372%	0.0%
HQ 2,5-11	11.0% at 33.9% of the chord	2.5% at 50.0% of the chord	0.7559%	0.0%
HQ 2,5-12	11.96% at 35.0% of the chord	2.5% at 50.0% of the chord	0.6646%	0.0%
HQ 2,5-14	13.95% at 35.0% of the chord	2.5% at 50.0% of the chord	0.8848%	0.0%
HQ 2,5-8	7.97% at 35.0% of the chord	2.5% at 50.0% of the chord	0.2831%	0.0%
HQ 2,5-9	8.97% at 35.0% of the chord	2.5% at 50.0% of the chord	0.3533%	0.0%
HQ 2,5-9 B	9.03% at 35.0% of the chord	2.53% at 55.0% of the chord	0.5932%	0.0%
HQ 2,5-9,0 smoothed by Eppler	9.03% at 35.0% of the chord	2.53% at 55.0% of the chord	0.5932%	0.0%
HQ 3,0-10	9.98% at 35.0% of the chord	2.99% at 50.0% of the chord	0.5008%	0.0%
HQ 3,0-11	10.98% at 35.0% of the chord	2.99% at 50.0% of the chord	0.6112%	0.0%
HQ 3,0-12	11.98% at 35.0% of the chord	2.99% at 50.0% of the chord	0.7458%	0.0%
HQ 3,0-13	12.99% at 35.0% of the chord	3.0% at 50.0% of the chord	0.8793%	0.0%
HQ 3,0-14	13.99% at 35.0% of the chord	2.99% at 50.0% of the chord	1.0282%	0.0%
HQ 3,0-15	14.98% at 35.0% of the chord	2.99% at 50.0% of the chord	1.1878%	0.0%
HQ 3,0-8	7.98% at 35.0% of the chord	2.99% at 50.0% of the chord	0.3254%	0.0%
HQ 3,0-9	8.98% at 35.0% of the chord	2.99% at 50.0% of the chord	0.4067%	0.0%
HQ 3,5-10	9.96% at 35.0% of the chord	3.5% at 50.0% of the chord	0.4799%	0.0%
HQ 3,5-12	11.96% at 35.0% of the chord	3.5% at 50.0% of the chord	0.7125%	0.0%
HQ 3,5-13	13.0% at 35.0% of the chord	3.5% at 50.0% of the chord	0.8515%	0.0%
HQ 3,5-14	14.0% at 35.0% of the chord	3.5% at 50.0% of the chord	1.0389%	0.0%
HQ 3,5-18	18.0% at 35.0% of the chord	3.5% at 50.0% of the chord	1.8464%	0.0%
HQ 3,5-8	7.97% at 35.0% of the chord	3.5% at 50.0% of the chord	0.3116%	0.0%
HQ 3,5-9	8.97% at 35.0% of the chord	3.5% at 50.0% of the chord	0.3886%	0.0%
HQ-00-09	8.11% at 33.9% of the chord	0.0% at 0.0% of the chord	0.4787%	0.0%
HQ-2,0-9 9,0% smoothed	8.97% at 35.0% of the chord	1.99% at 50.0% of the chord	0.3802%	0.0%
HQ-20-11	11.0% at 33.9% of the chord	2.0% at 50.0% of the chord	0.7479%	0.0%
HQ-60-20	20.0% at 33.9% of the chord	6.0% at 50.0% of the chord	2.2068%	0.0%
HS 2.0/8.0	7.99% at 30.0% of the chord	2.0% at 25.0% of the chord	0.347%	0.0%
HS 3.0/8	8.0% at 30.0% of the chord	2.97% at 30.0% of the chord	0.2611%	0.0%
HS 3.0/9.0	8.99% at 30.0% of the chord	2.94% at 30.0% of the chord	0.4474%	0.0%
HS 3.5/12	12.0% at 30.0% of the chord	3.5% at 30.0% of the chord	1.2295%	0.0%
HS 510	8.79% at 27.0% of the chord	2.19% at 27.0% of the chord	0.7213%	0.0%
HS 602	10.21% at 28.7% of the chord	2.98% at 55.7% of the chord	0.7578%	0.0%
HSNLF(1)-0213	13.25% at 42.6% of the chord	1.37% at 32.6% of the chord	0.9494%	0.134%
HT 05	4.81% at 17.1% of the chord	0.0% at 0.1% of the chord	0.5373%	0.36%
HT 08	5.0% at 20.2% of the chord	0.07% at 0.0% of the chord	0.4859%	0.3472%
HT 12	5.02% at 18.6% of the chord	0.0% at 1.7% of the chord	0.4965%	0.238%
HT22	5.08% at 19.1% of the chord	1.07% at 22.7% of the chord	0.6161%	0.163%
HT23	6.51% at 20.8% of the chord	1.08% at 22.6% of the chord	0.6993%	0.2082%
HUGHES HELICOPTERS HH-02	9.57% at 30.0% of the chord	2.02% at 40.0% of the chord	0.6722%	0.38%
hydrofoil"Profile 915"	9.09% at 35.7% of the chord	1.76% at 67.0% of the chord	0.449%	0.0%
hydrofoil"Profile 930"	9.08% at 33.6% of the chord	3.02% at 57.9% of the chord	0.5023%	0.0%

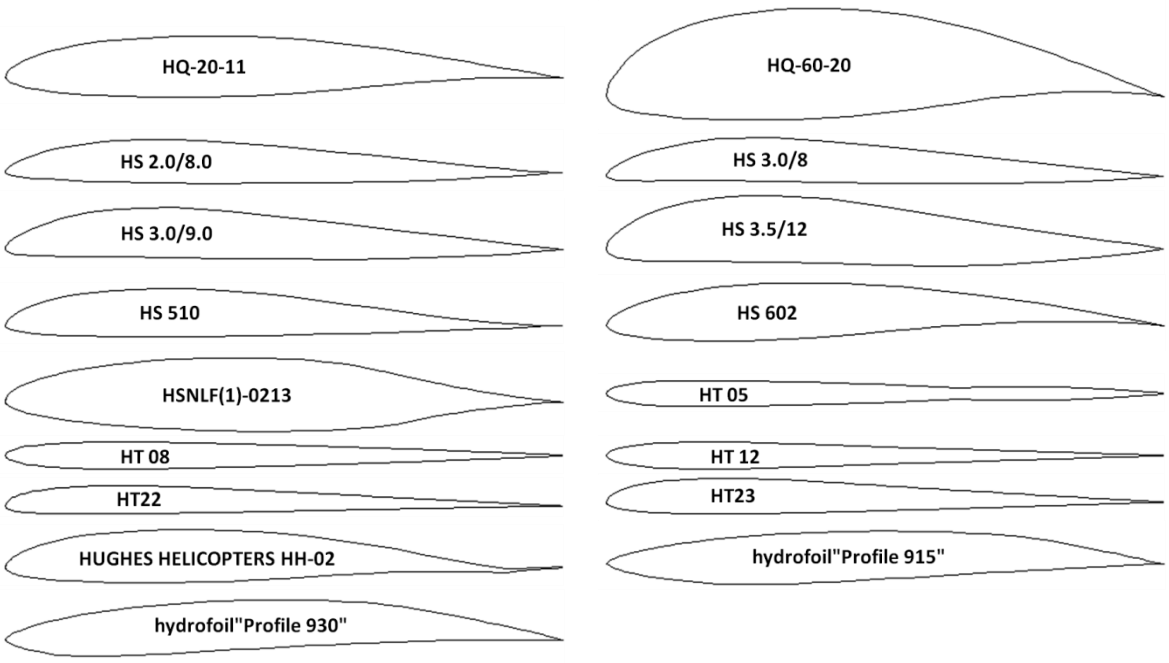
Note:
HN-832TA, HN-951, HN-956, HN-971, HN-972, HN-974, HN-975, HN-975TA, HN-980 (Planeur>3.5m, Norbert Habbe);
HN-785SR, HN-805 (F3F Norbert Habbe);
HN-785, HN-981, HN-989, HN-990 (F3B Norbert Habbe);
HN-979, HN979D, HN-997A, HN-997B, HN-998, HN-999 (HLG Norbert Habbe);
HN-464 (Planeur Norbert Habbe);
HN-961SA, HN-976S (Aile volante Norbert Habbe);
HN-465, HN-973 (F3J Norbert Habbe);
HN-801 (BASIC Norbert Habbe);
HN-808, HN-832 (Planeur<3.5m, Norbert Habbe);

Hobie Hawk (Hobie Hawk R/C sailplane);
HQ 2,0-13, HQ 2,5-14 (Elaborato da Profili 1.2);
HS 2.0/8.0, HS 3.0/8, HS 3.0/9.0, HS 3.5/12, HS 510, HS 602 (Hartmut Siegmann);
HT 05 (Tail section Apogee HLG series Molded Wing C);
HT 08 (Allegro 2m tail section 1 Mark Drela);
HT 12 (Allegro 2m tail section 2 Mark Drela);
HT22, HT23 (SuperGee RC DLG by Mark Drela);
hydrofoil"Profile 915", hydrofoil"Profile 930" (Johannes Schoon).

Table 2. The geometric shapes of the airfoils in the cross section.




HQ 0-9
HQ 1,0-10
HQ 1,0-12
HQ 1,0-8
HQ 1,0-9
HQ 1,5-10
HQ 1,5-11
HQ 1,5-12
HQ 1,5-8
HQ 1,5-8,5
HQ 1,5-9
HQ 1,5-9 B
HQ 2,0-10
HQ 2,0-11
HQ 2,0-12
HQ 2,0-13
HQ 2,0-8
HQ 2,0-9
HQ 2,1-9,5
HQ 2,5-10
HQ 2,5-11
HQ 2,5-12
HQ 2,5-14
HQ 2,5-8
HQ 2,5-9
HQ 2,5-9 B
HQ 2,5-9,0 smoothed by Eppler
HQ 3,0-10
HQ 3,0-11
HQ 3,0-12
HQ 3,0-13
HQ 3,0-14
HQ 3,0-15
HQ 3,0-8
HQ 3,0-9
HQ 3,5-10
HQ 3,5-12
HQ 3,5-13
HQ 3,5-14
HQ 3,5-18
HQ 3,5-8
HQ 3,5-9
HQ-00-09
HQ-2,0-9 9,0% smoothed



Results and discussion

The calculated pressure contours on the surfaces of the airfoils at the different angles of attack are presented in the Figs. 1-101.

The calculated values on the scale can be represented as the basic values when comparing the pressure drop under conditions of changing the angle of attack of the airfoils.

In this work, 99 airfoils and 2 hydrofoils of the HN, HQ, HT, HS, etc. series were studied. The airfoils are represented by asymmetrical geometries and symmetrical geometries (HN-976S, HQ 0-10, HQ 0-7, HQ 0-9, HQ-00-09, HT 05 and HT 12) in the cross section.

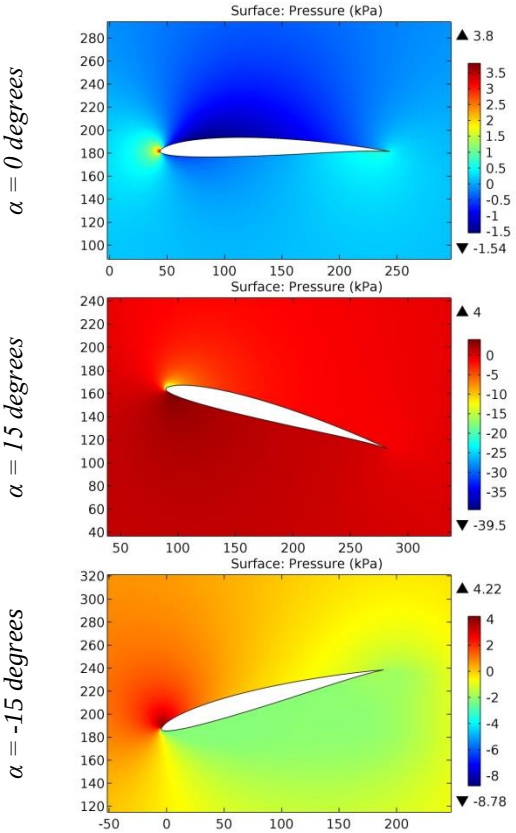


Figure 1. The pressure contours on the surfaces of the HN-464 airfoil.

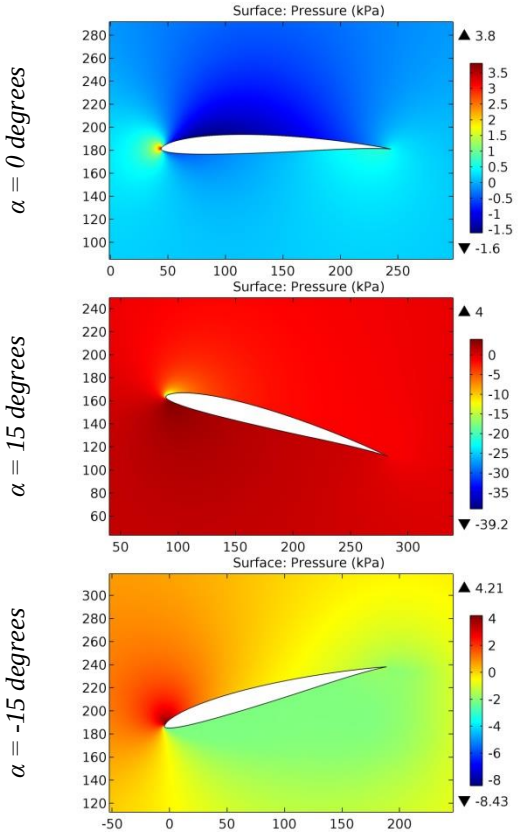


Figure 2. The pressure contours on the surfaces of the HN-465 airfoil.

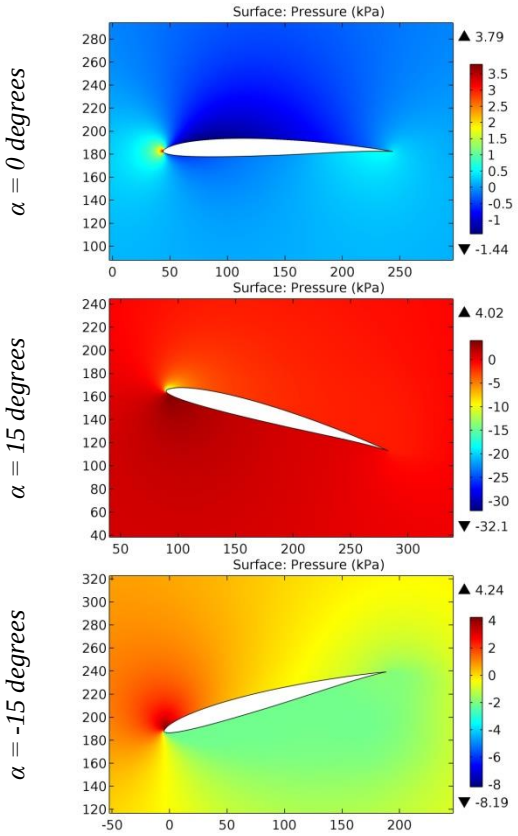


Figure 3. The pressure contours on the surfaces of the HN-785 airfoil.

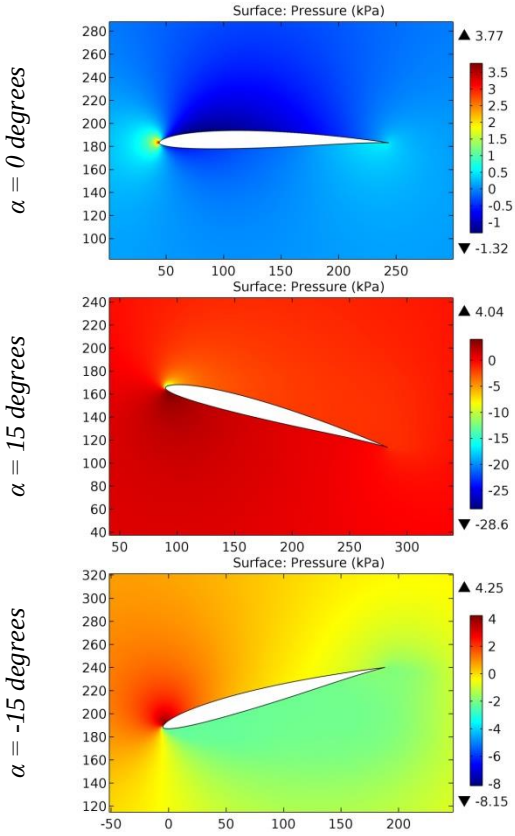


Figure 4. The pressure contours on the surfaces of the HN-785SR airfoil.

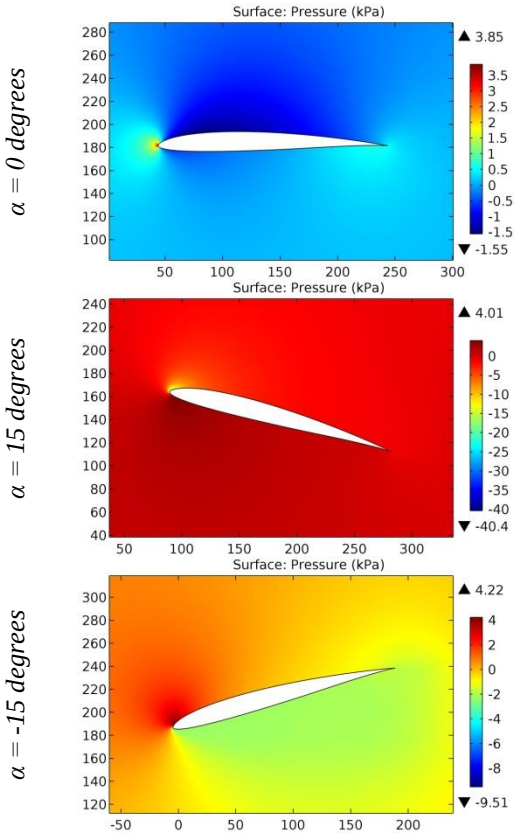


Figure 5. The pressure contours on the surfaces of the HN-801 airfoil.

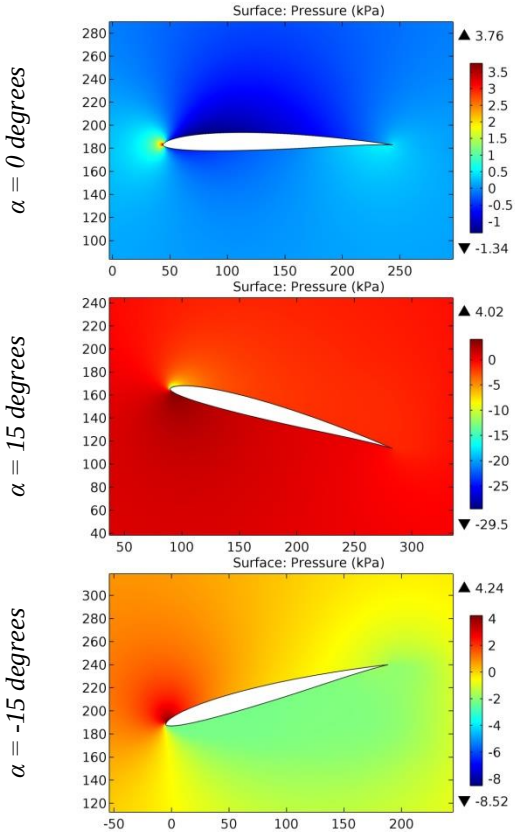


Figure 6. The pressure contours on the surfaces of the HN-805 airfoil.

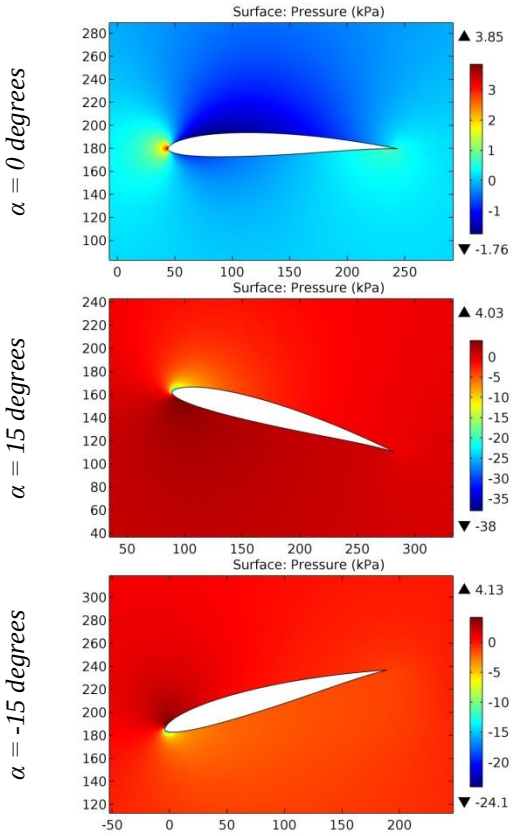


Figure 7. The pressure contours on the surfaces of the HN-808 airfoil.

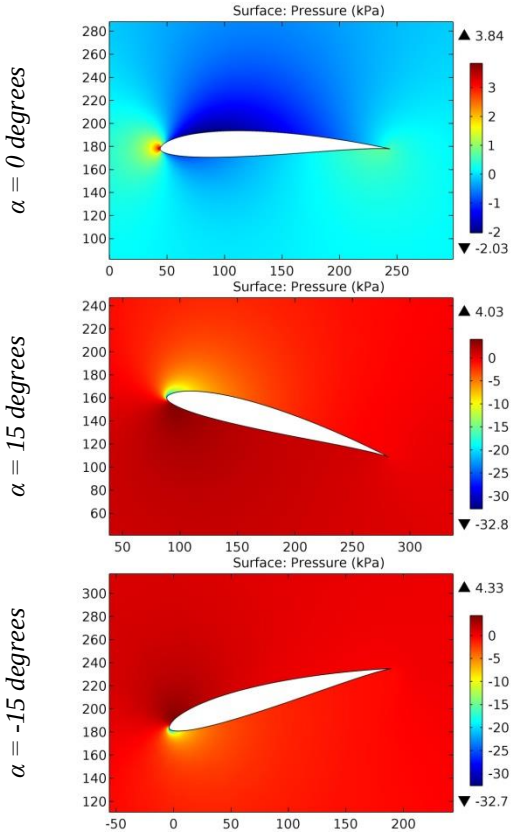


Figure 8. The pressure contours on the surfaces of the HN-832 airfoil.

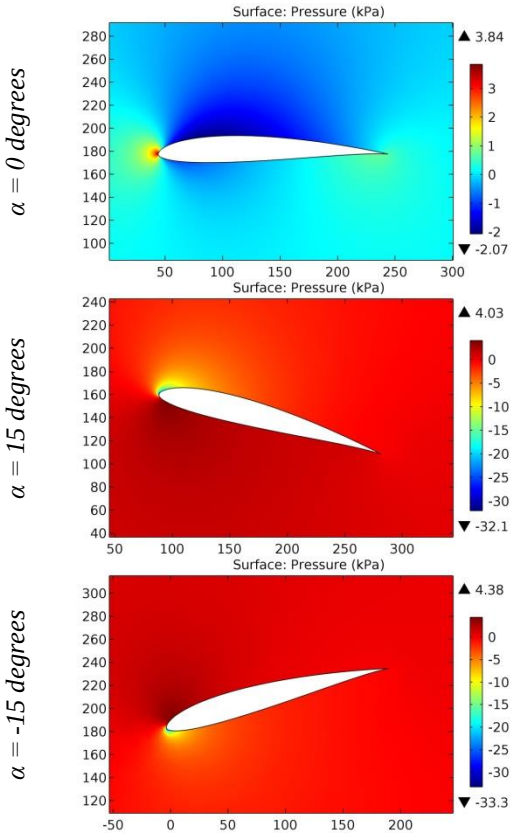


Figure 9. The pressure contours on the surfaces of the HN-832TA airfoil.

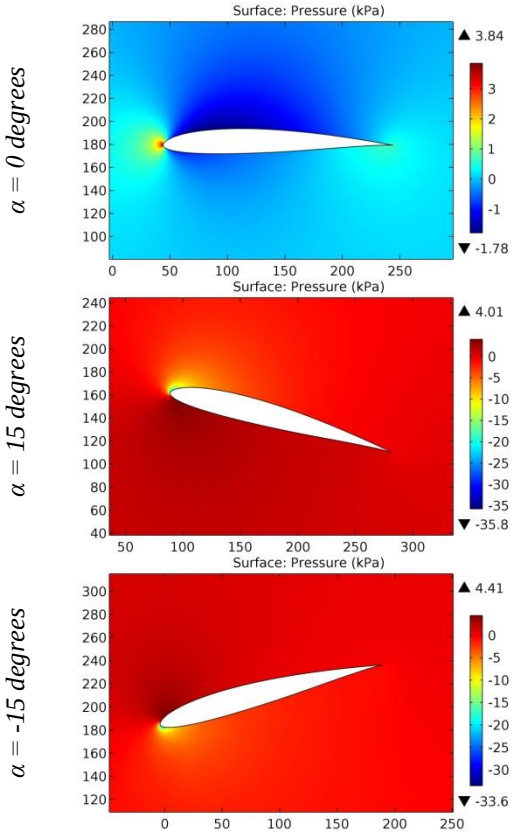


Figure 10. The pressure contours on the surfaces of the HN-951 airfoil.

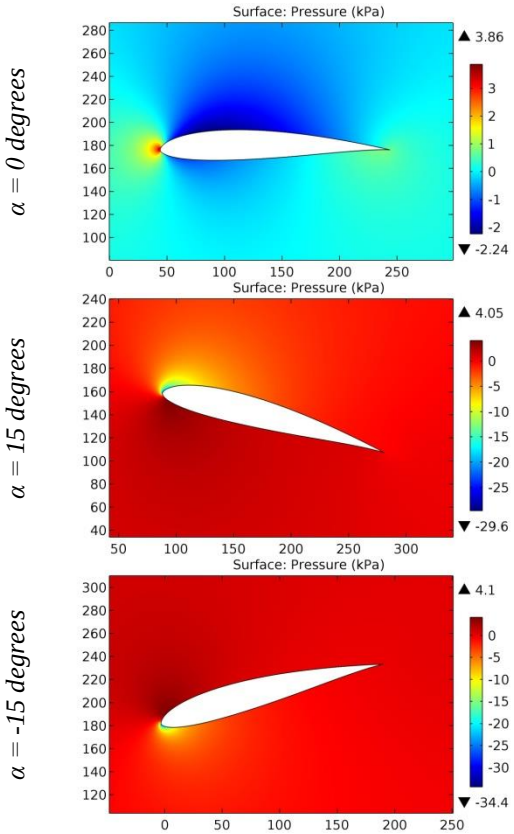


Figure 11. The pressure contours on the surfaces of the HN-956 airfoil.

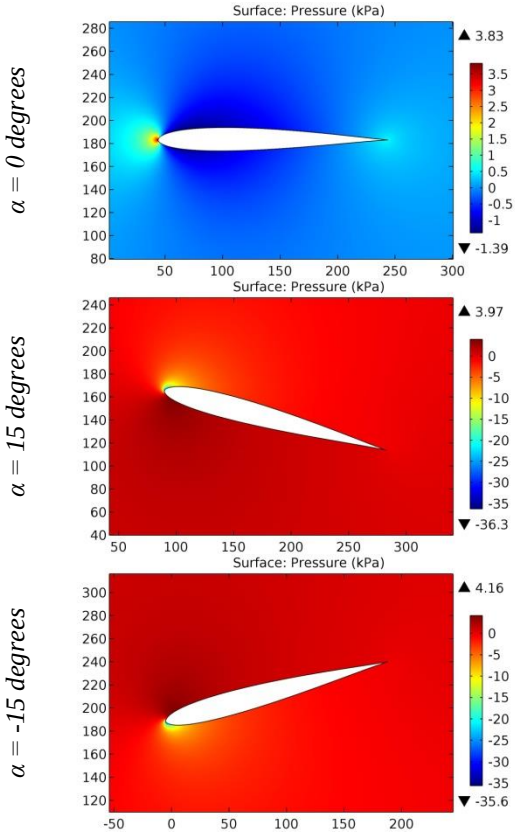


Figure 12. The pressure contours on the surfaces of the HN-961SA airfoil.

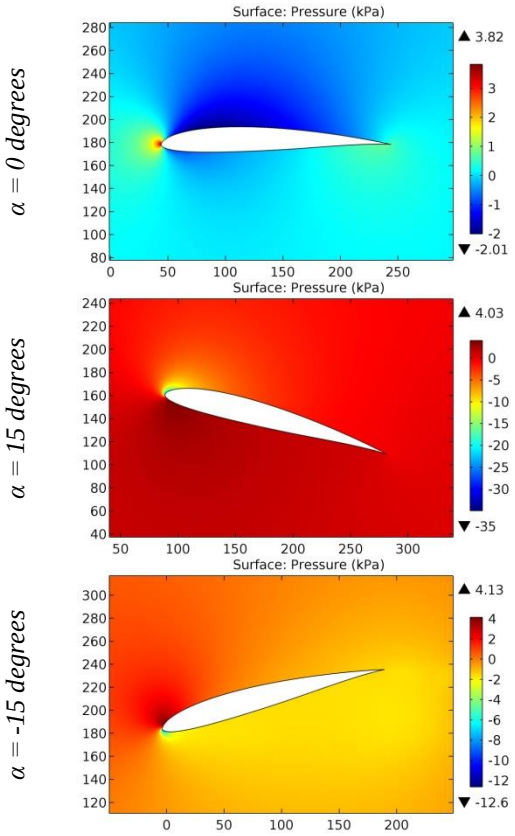


Figure 13. The pressure contours on the surfaces of the HN-971 airfoil.

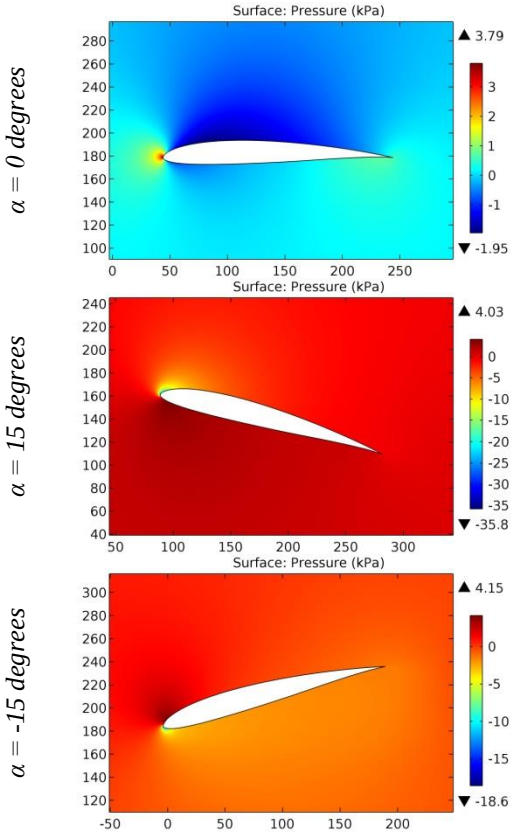


Figure 14. The pressure contours on the surfaces of the HN-972 airfoil.

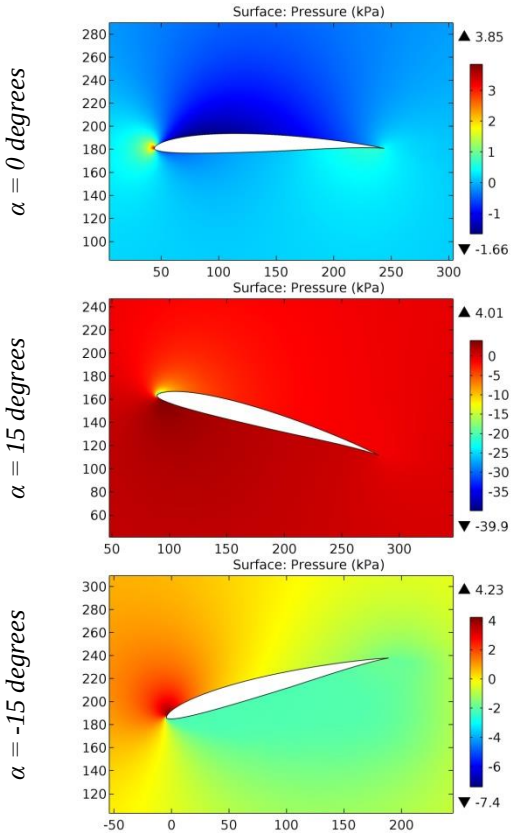


Figure 15. The pressure contours on the surfaces of the HN-973 airfoil.

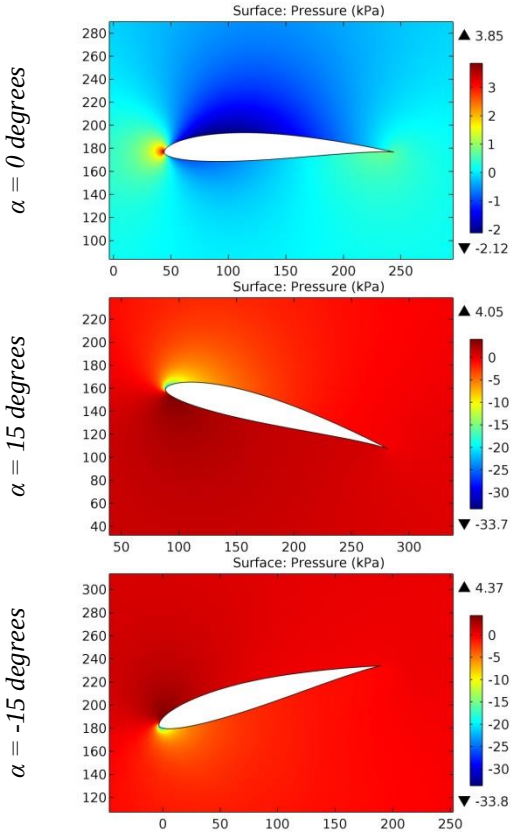


Figure 16. The pressure contours on the surfaces of the HN-974 airfoil.

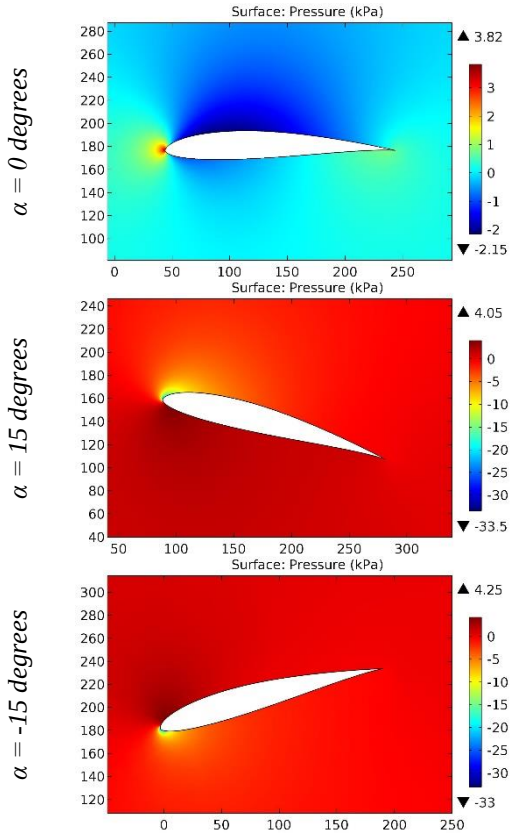


Figure 17. The pressure contours on the surfaces of the HN-975 airfoil.

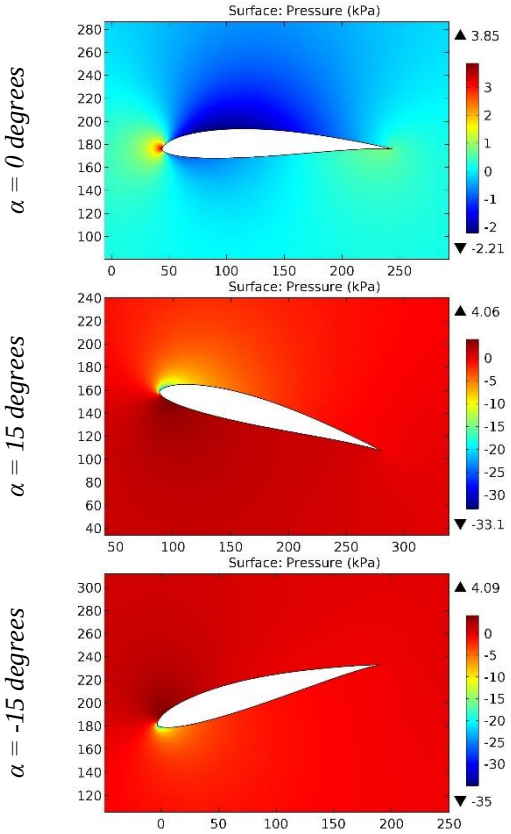


Figure 18. The pressure contours on the surfaces of the HN-975TA airfoil.

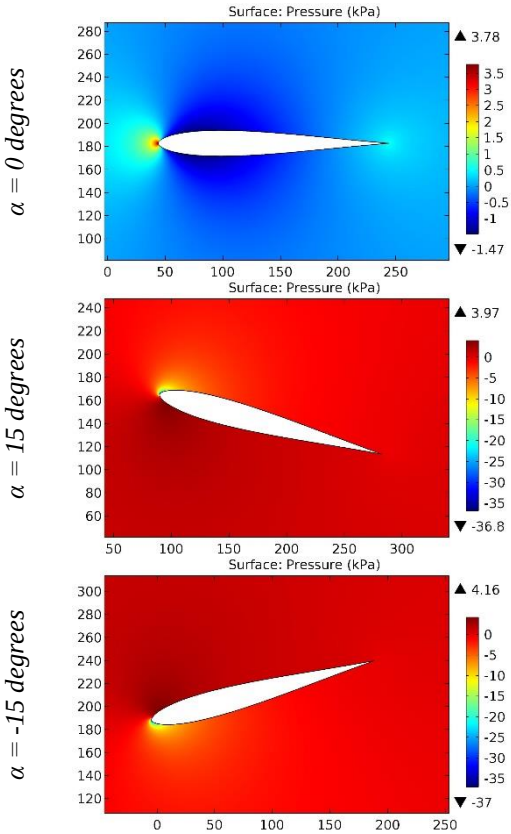


Figure 19. The pressure contours on the surfaces of the HN-976S airfoil.

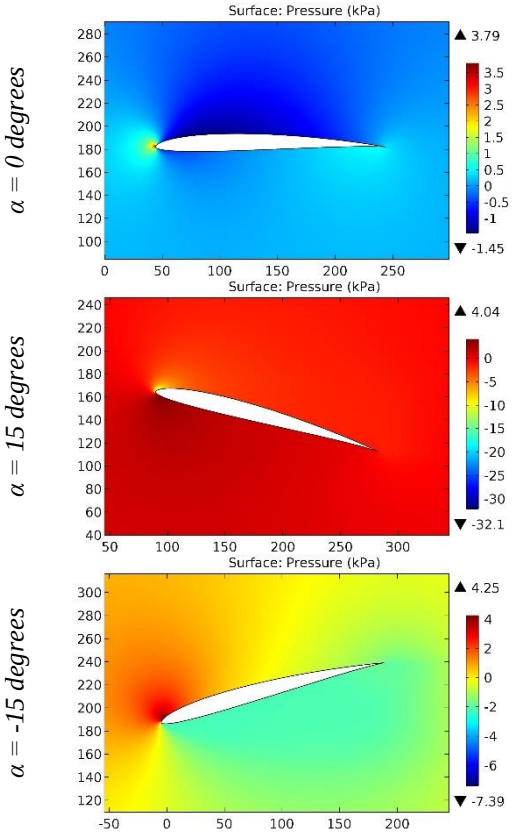


Figure 20. The pressure contours on the surfaces of the HN-979 airfoil.

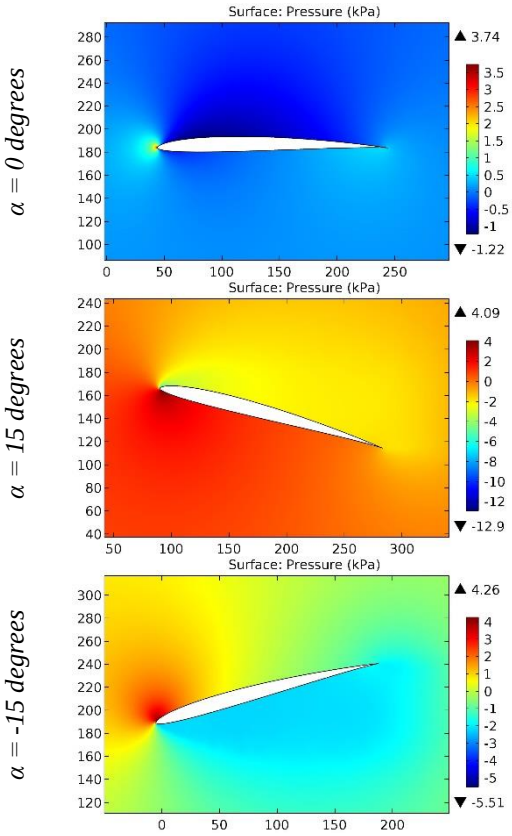


Figure 21. The pressure contours on the surfaces of the HN979D airfoil.

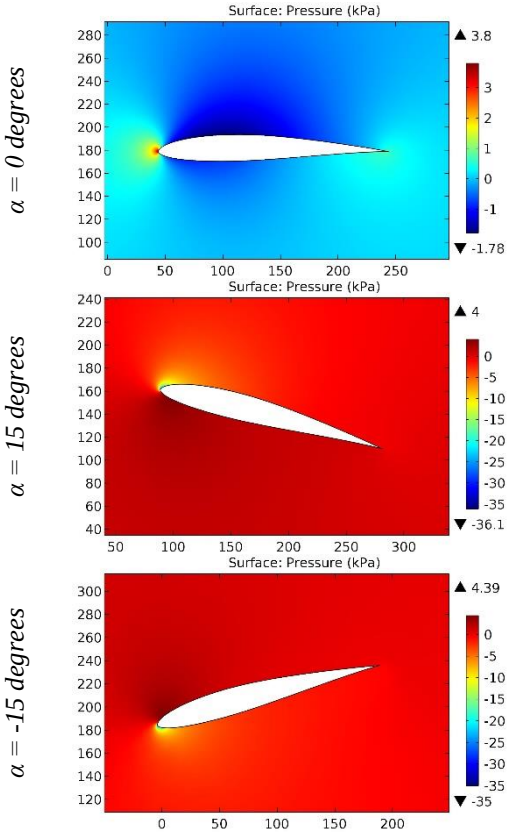


Figure 22. The pressure contours on the surfaces of the HN-980 airfoil.

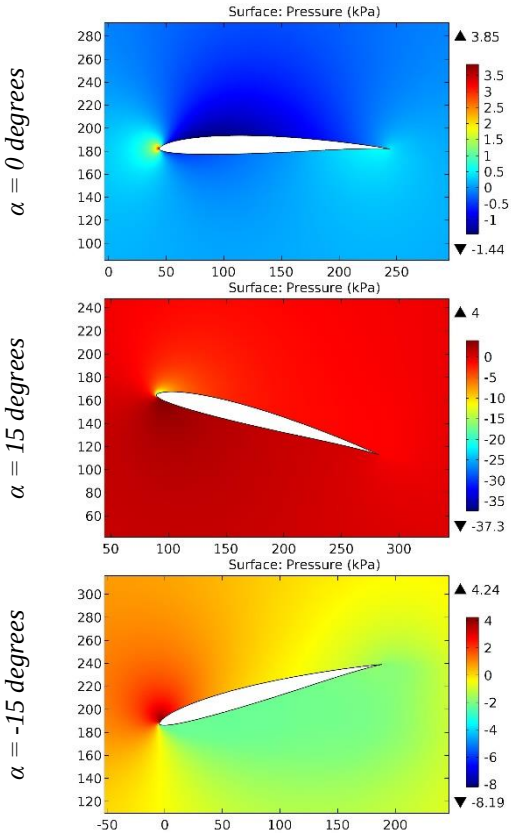


Figure 23. The pressure contours on the surfaces of the HN-981 airfoil.

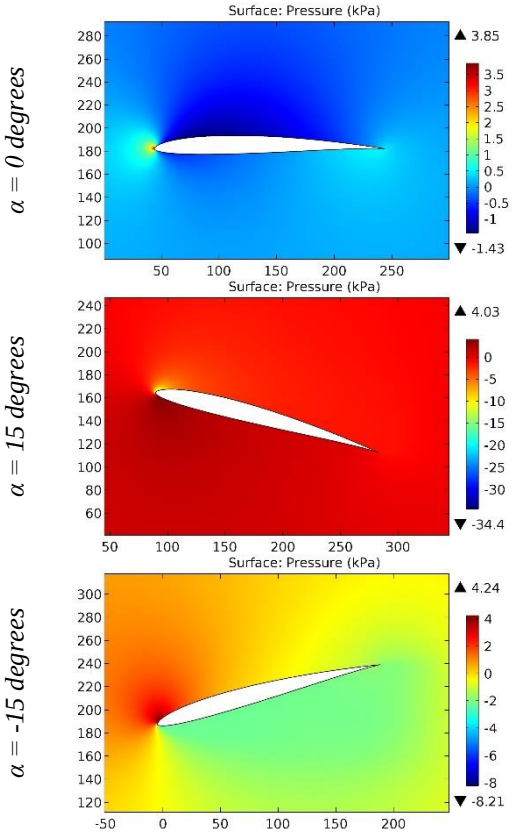


Figure 24. The pressure contours on the surfaces of the HN-989 airfoil.

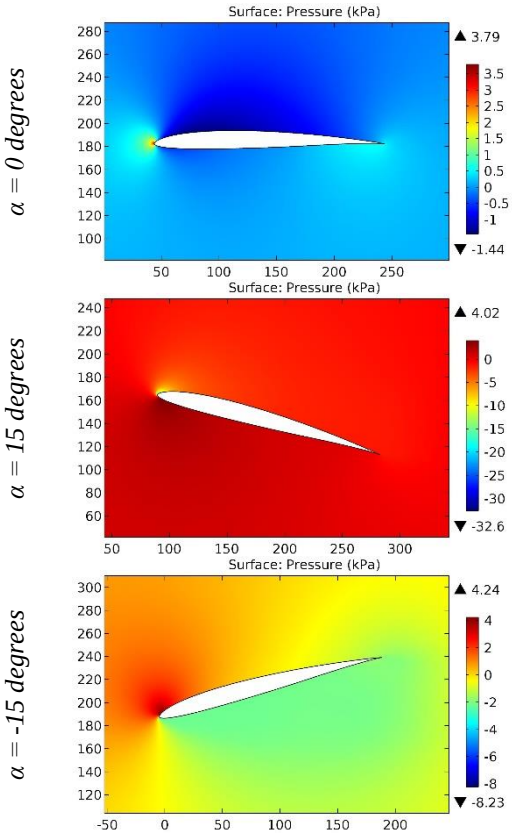


Figure 25. The pressure contours on the surfaces of the HN-990 airfoil.

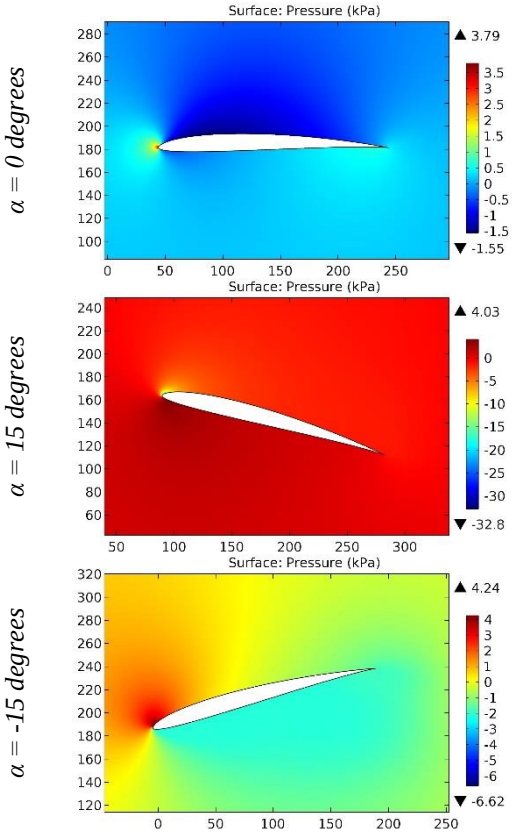


Figure 26. The pressure contours on the surfaces of the HN-997A airfoil.

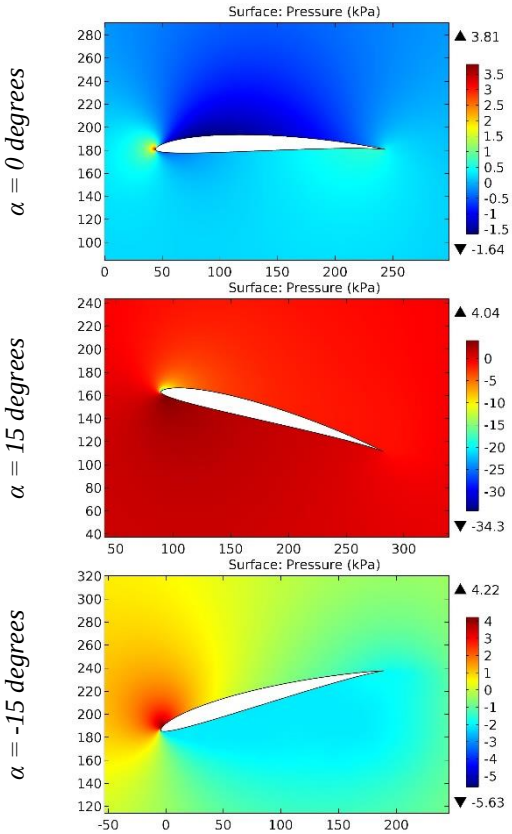


Figure 27. The pressure contours on the surfaces of the HN-997B airfoil.

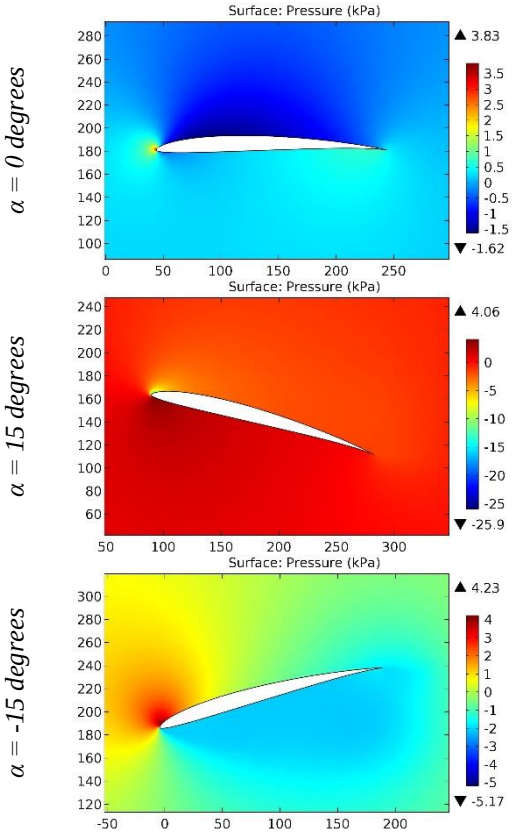


Figure 28. The pressure contours on the surfaces of the HN-998 airfoil.

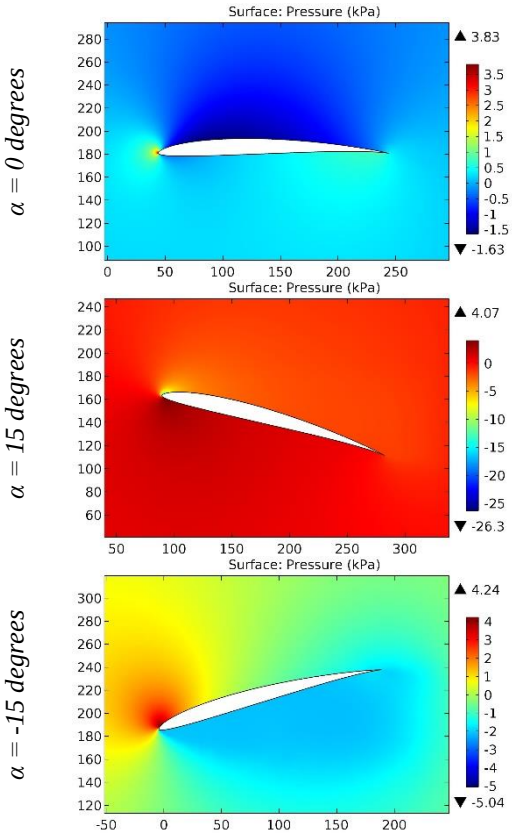


Figure 29. The pressure contours on the surfaces of the HN-999 airfoil.

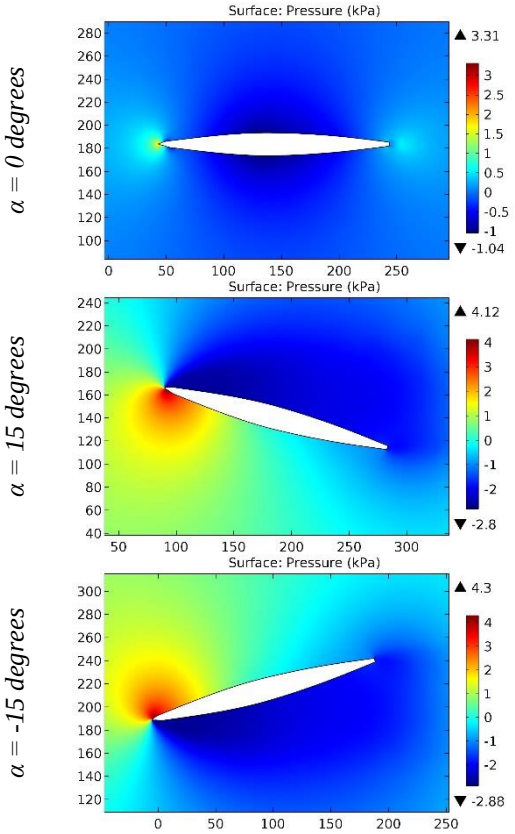


Figure 30. The pressure contours on the surfaces of the HO1 airfoil.

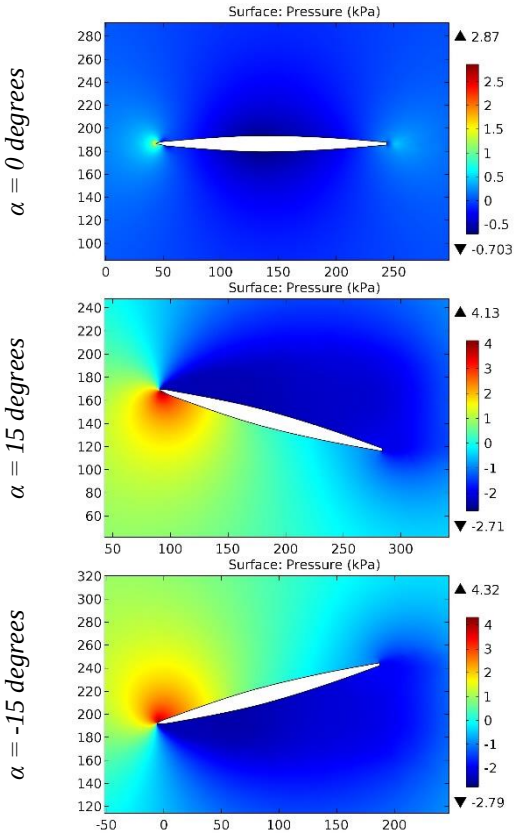


Figure 31. The pressure contours on the surfaces of the HO1U airfoil.

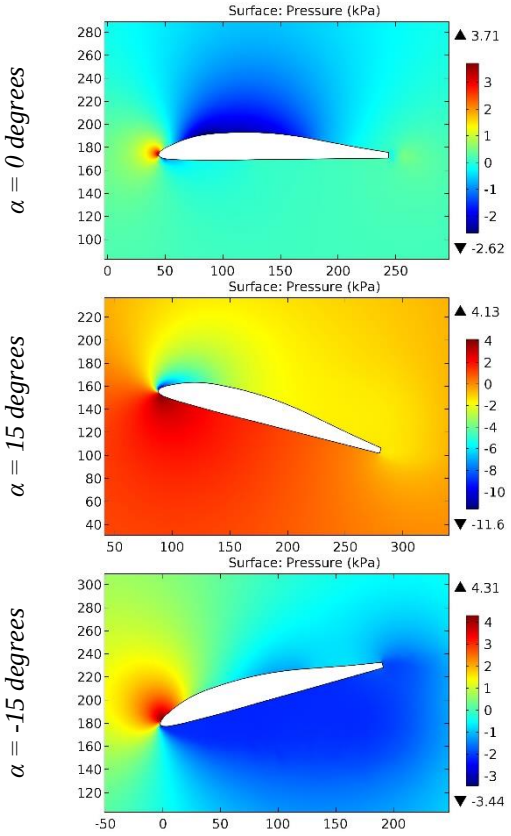


Figure 32. The pressure contours on the surfaces of the HO2 airfoil.

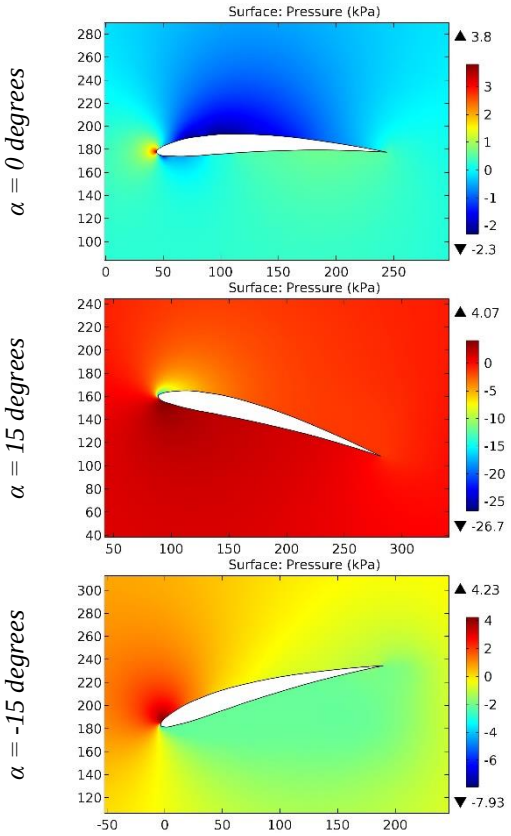


Figure 33. The pressure contours on the surfaces of the HOBIE airfoil.

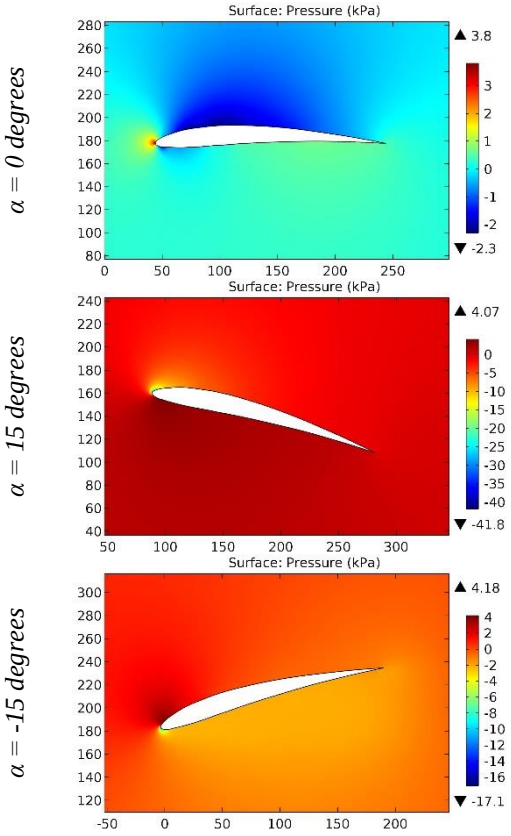


Figure 34. The pressure contours on the surfaces of the Hobie Hawk airfoil.

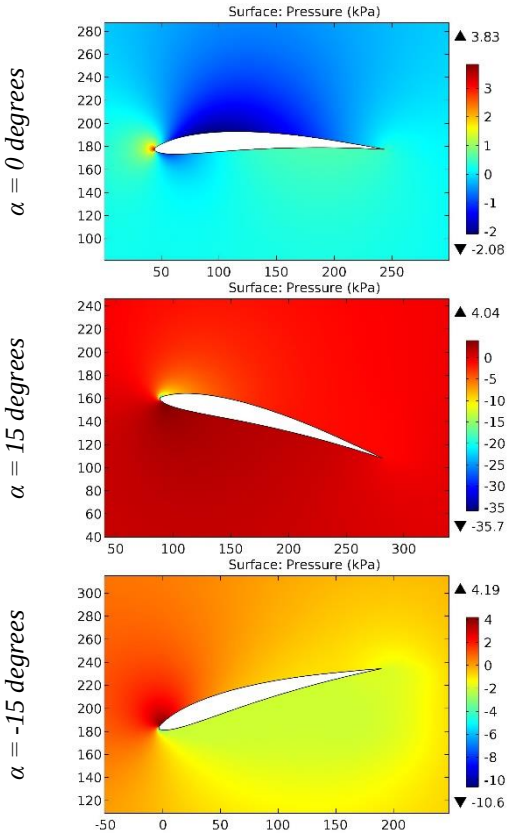


Figure 35. The pressure contours on the surfaces of the HOBIE-SM airfoil.

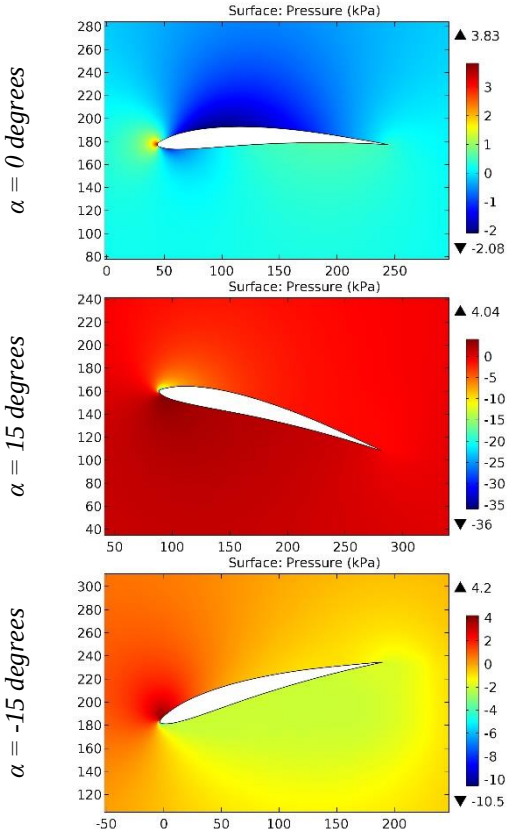


Figure 36. The pressure contours on the surfaces of the HOBIESMO1,DAT airfoil.

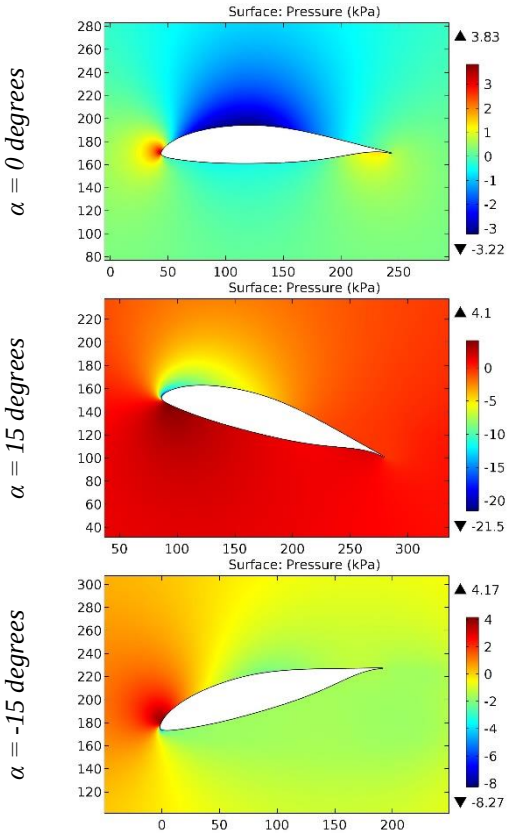


Figure 37. The pressure contours on the surfaces of the HORSTMANN AND QUAST HQ-300 GD(MOD 2) airfoil.

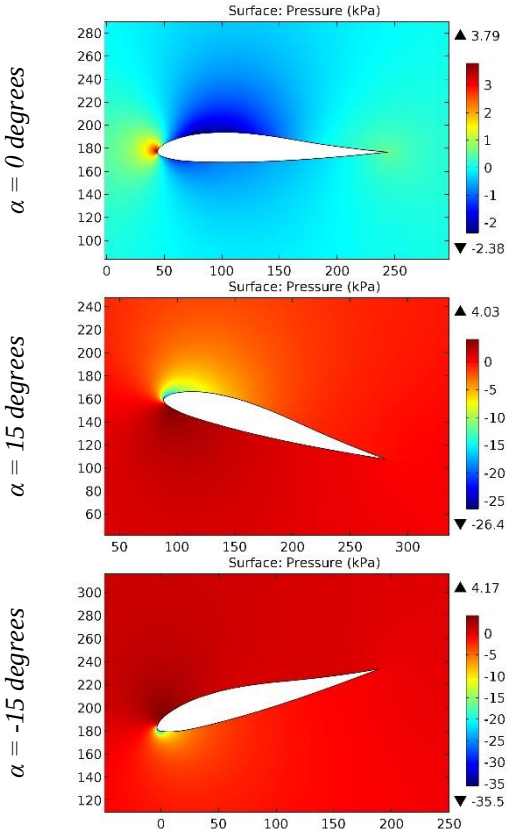


Figure 38. The pressure contours on the surfaces of the Horten Standard 13% airfoil.

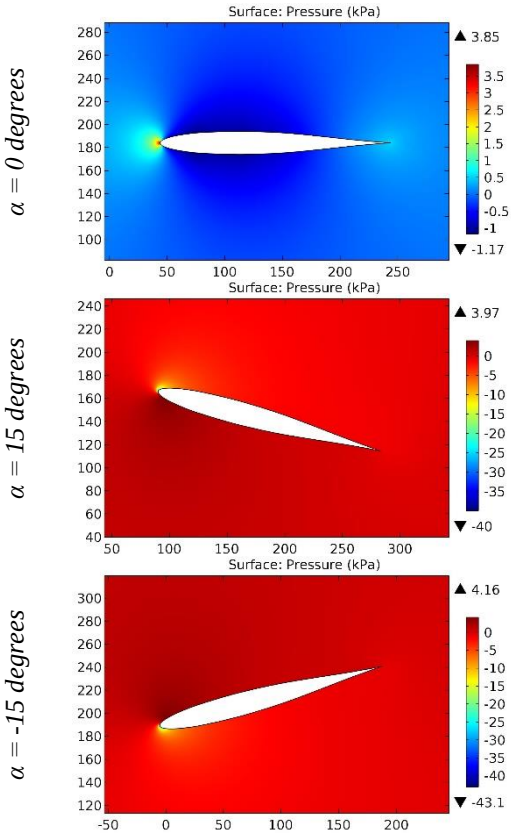


Figure 39. The pressure contours on the surfaces of the HQ 0-10 airfoil.

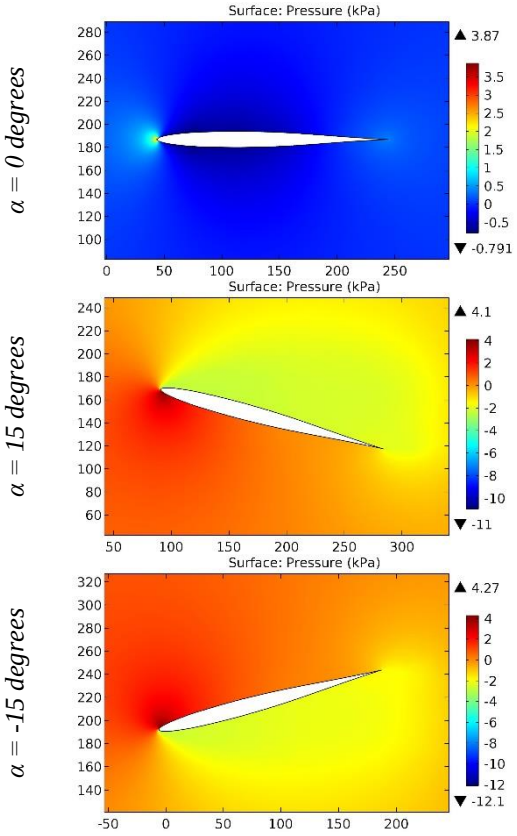


Figure 40. The pressure contours on the surfaces of the HQ 0-7 airfoil.

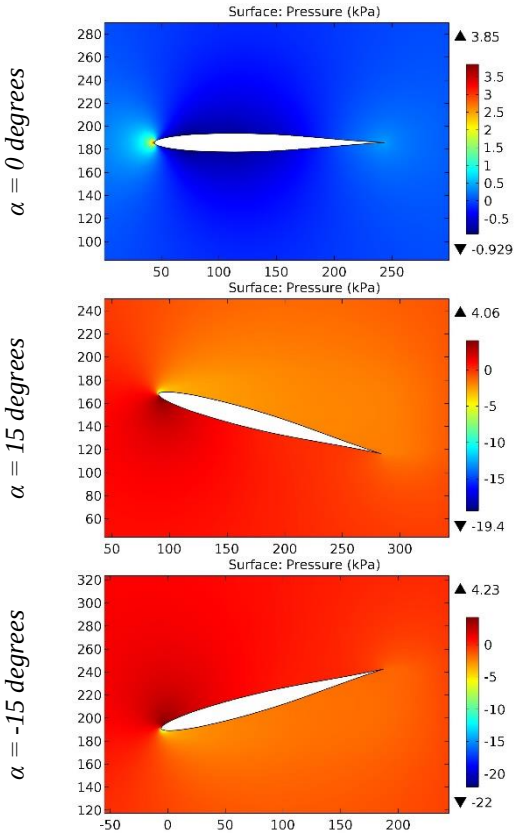


Figure 41. The pressure contours on the surfaces of the HQ 0-9 airfoil.

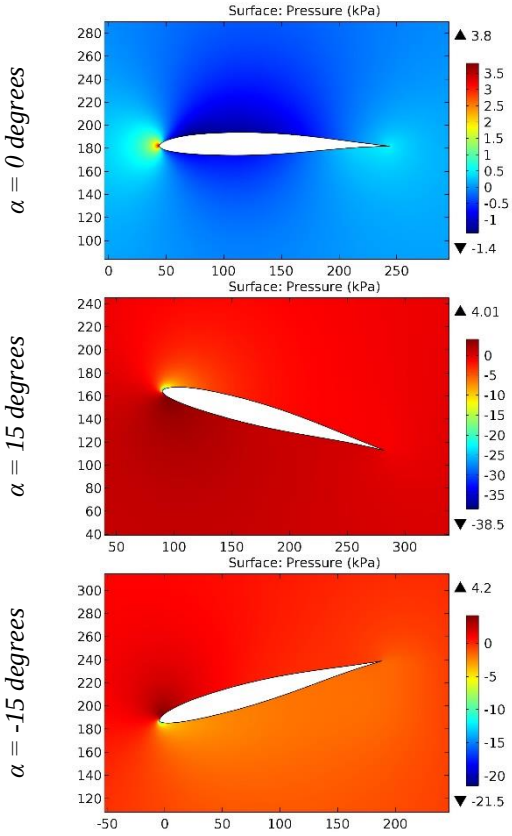


Figure 42. The pressure contours on the surfaces of the HQ 1,0-10 airfoil.

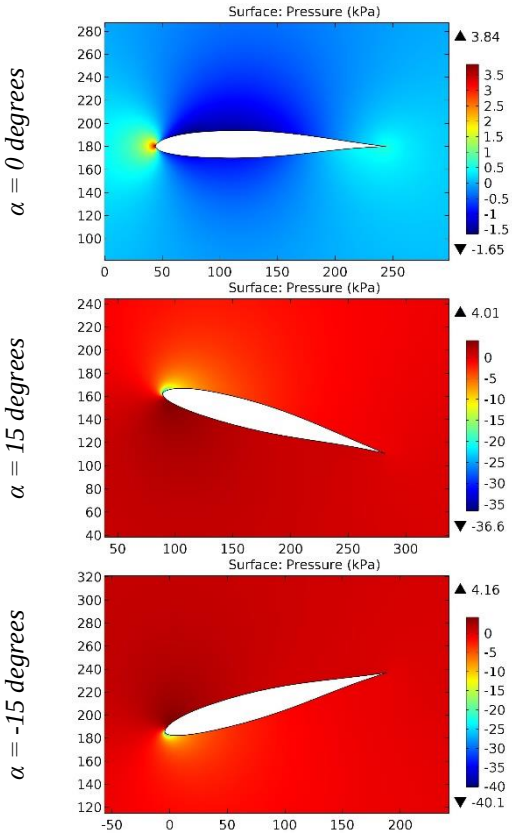


Figure 43. The pressure contours on the surfaces of the HQ 1,0-12 airfoil.

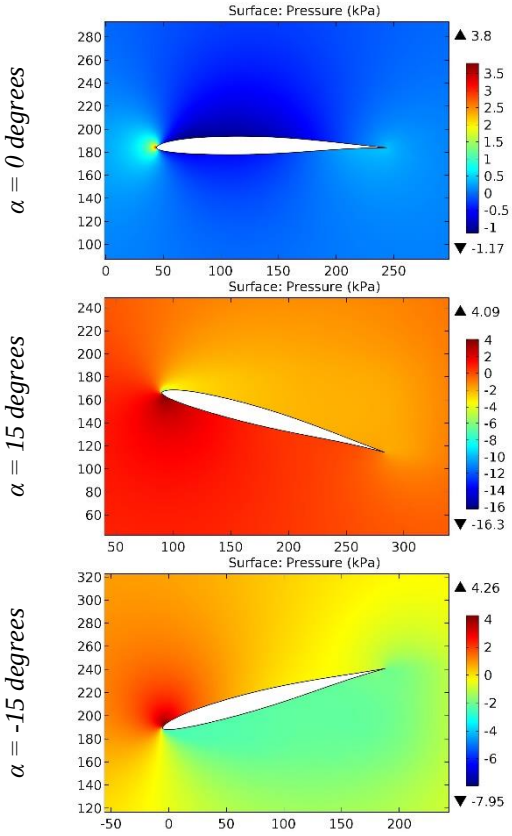


Figure 44. The pressure contours on the surfaces of the HQ 1,0-8 airfoil.

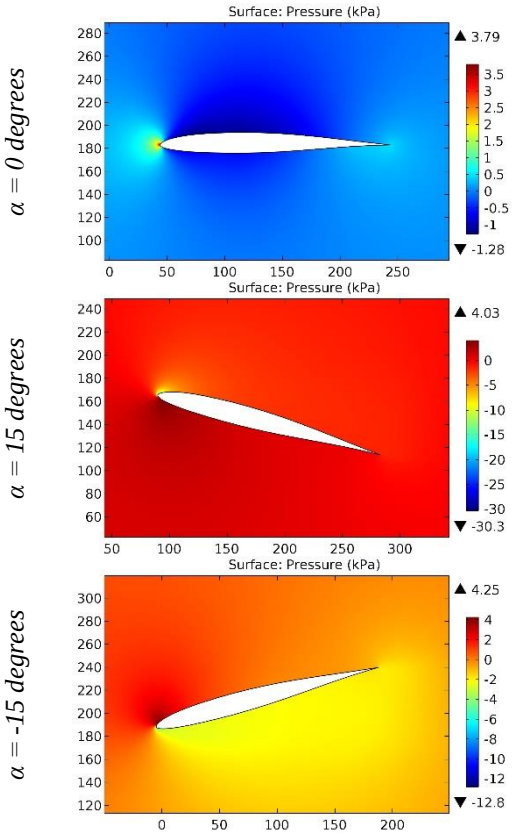


Figure 45. The pressure contours on the surfaces of the HQ 1,0-9 airfoil.

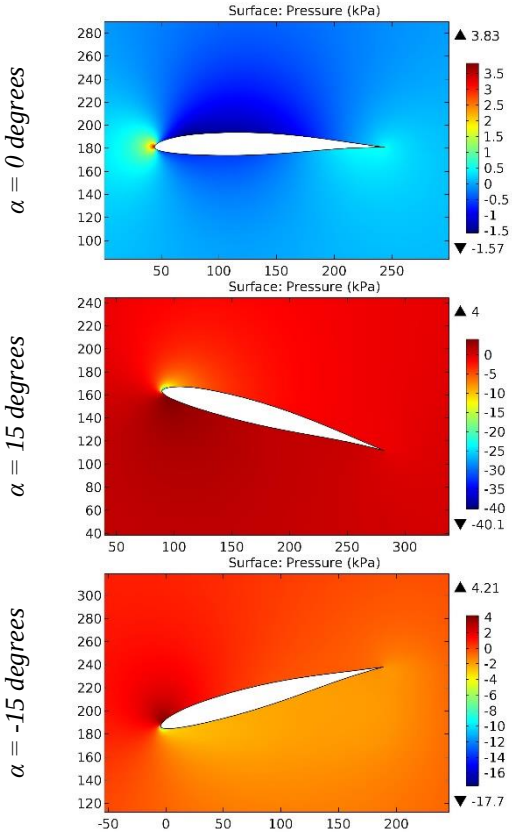


Figure 46. The pressure contours on the surfaces of the HQ 1,5-10 airfoil.

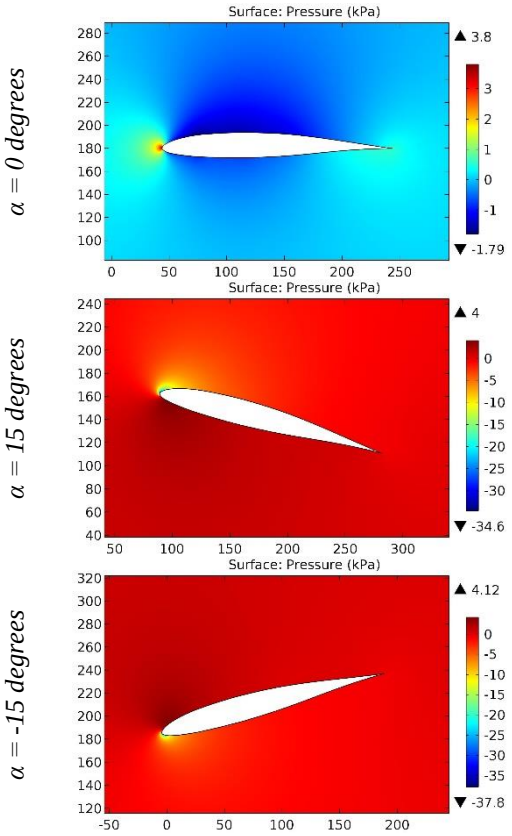


Figure 47. The pressure contours on the surfaces of the HQ 1,5-11 airfoil.

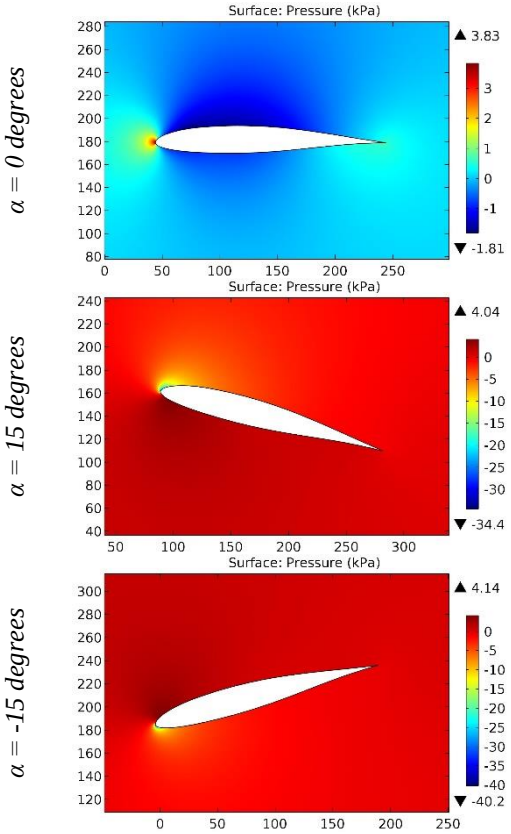


Figure 48. The pressure contours on the surfaces of the HQ 1,5-12 airfoil.

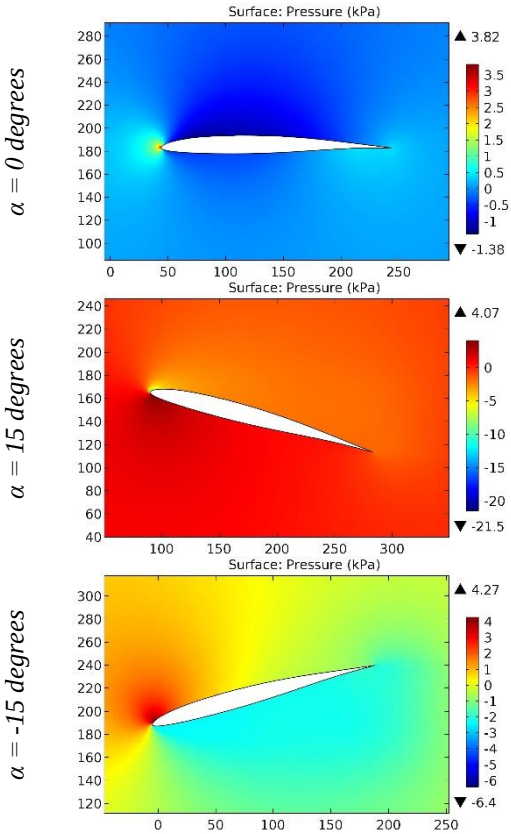


Figure 49. The pressure contours on the surfaces of the HQ 1,5-8 airfoil.

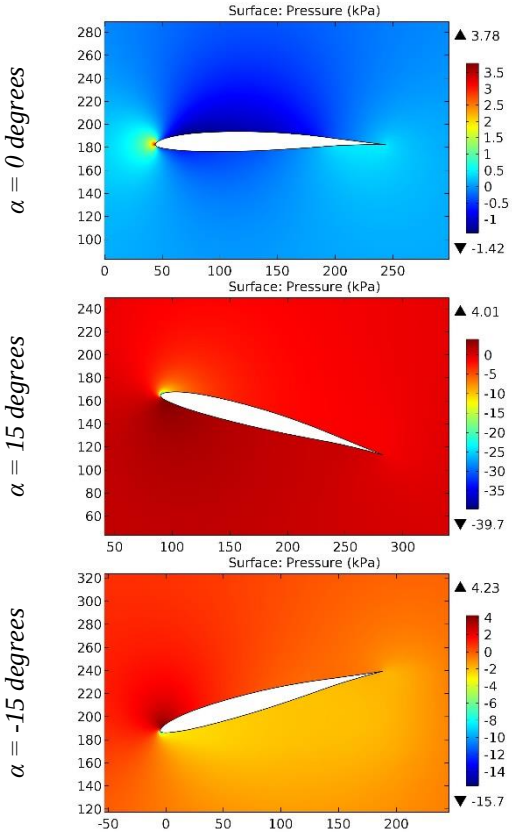


Figure 50. The pressure contours on the surfaces of the HQ 1,5-8,5 airfoil.

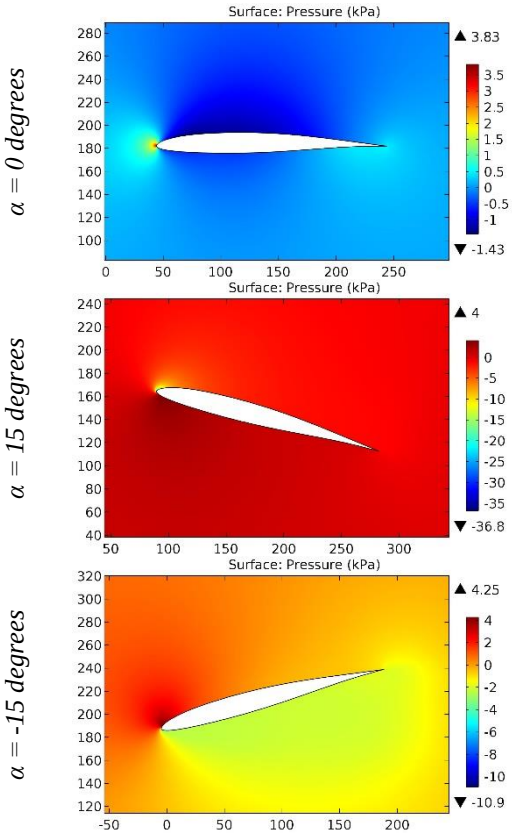


Figure 51. The pressure contours on the surfaces of the HQ 1,5-9 airfoil.

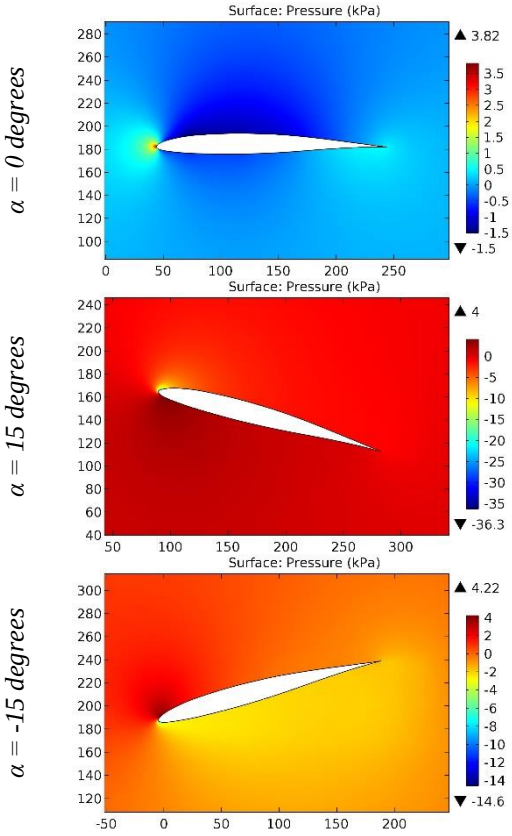


Figure 52. The pressure contours on the surfaces of the HQ 1,5-9 B airfoil.

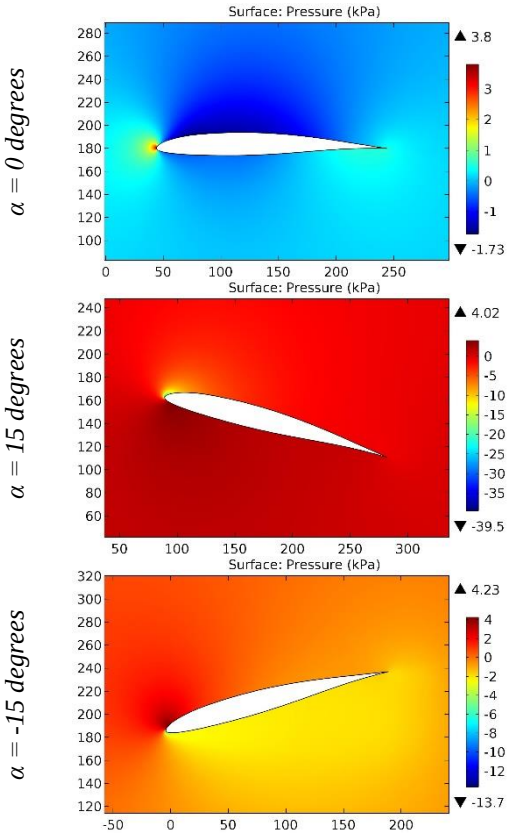


Figure 53. The pressure contours on the surfaces of the HQ 2,0-10 airfoil.

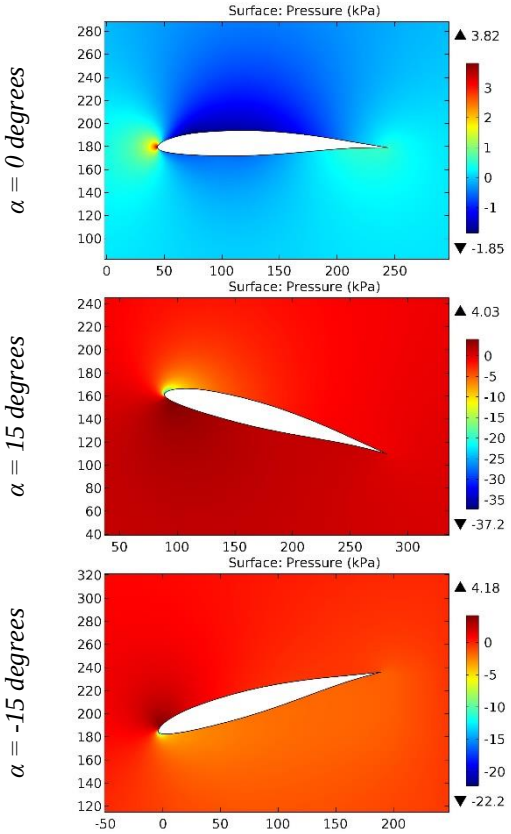


Figure 54. The pressure contours on the surfaces of the HQ 2,0-11 airfoil.

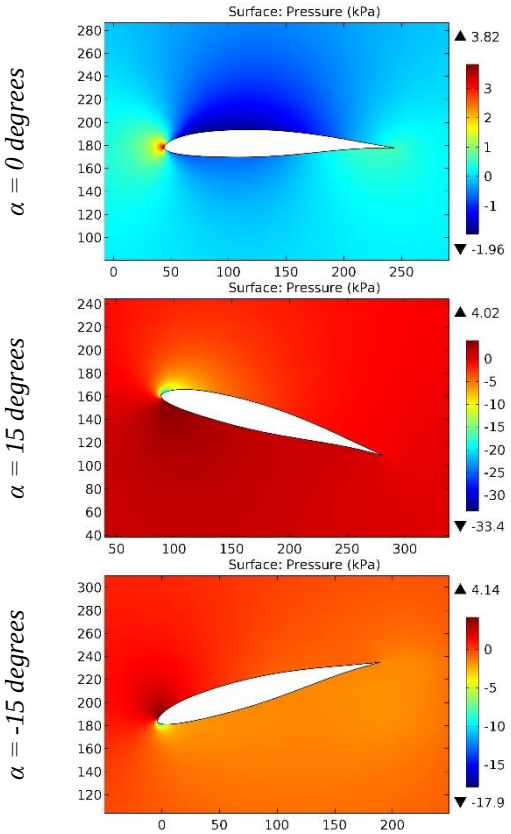


Figure 55. The pressure contours on the surfaces of the HQ 2,0-12 airfoil.

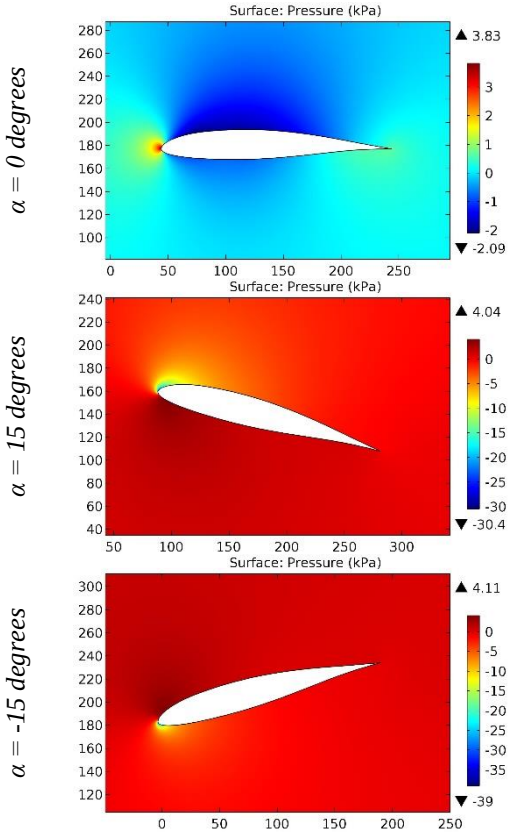


Figure 56. The pressure contours on the surfaces of the HQ 2,0-13 airfoil.

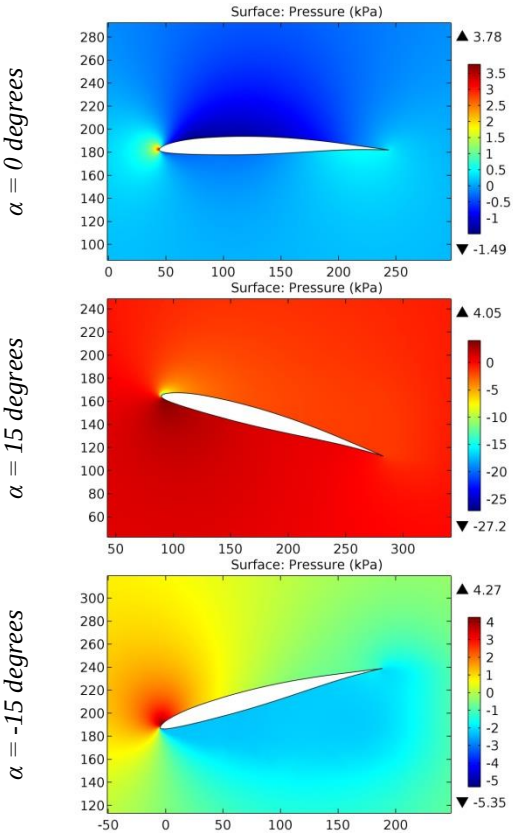


Figure 57. The pressure contours on the surfaces of the HQ 2,0-8 airfoil.

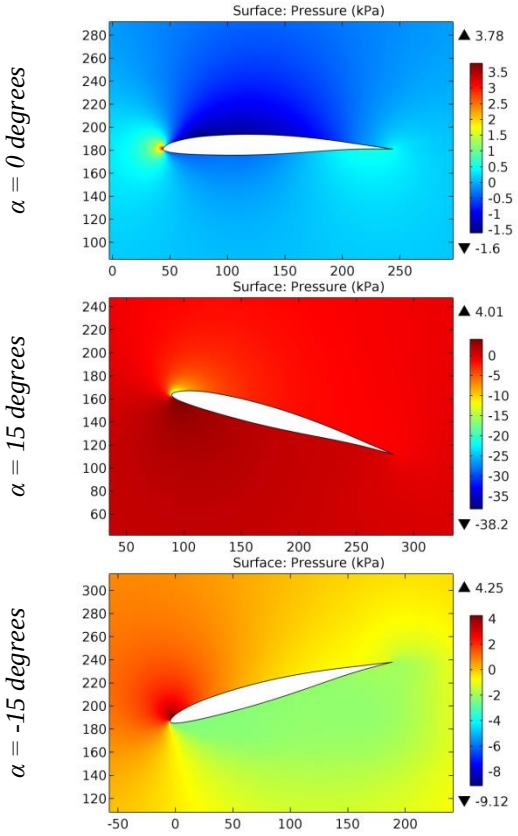


Figure 58. The pressure contours on the surfaces of the HQ 2,0-9 airfoil.

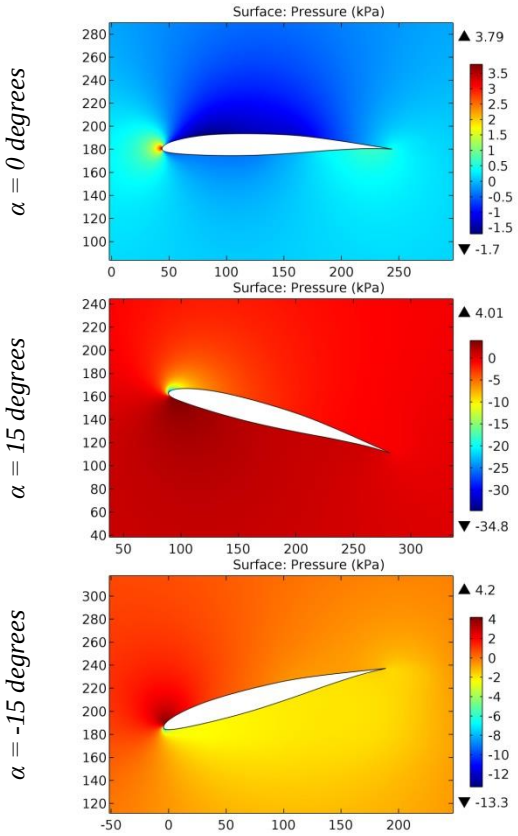


Figure 59. The pressure contours on the surfaces of the HQ 2,1-9,5 airfoil.

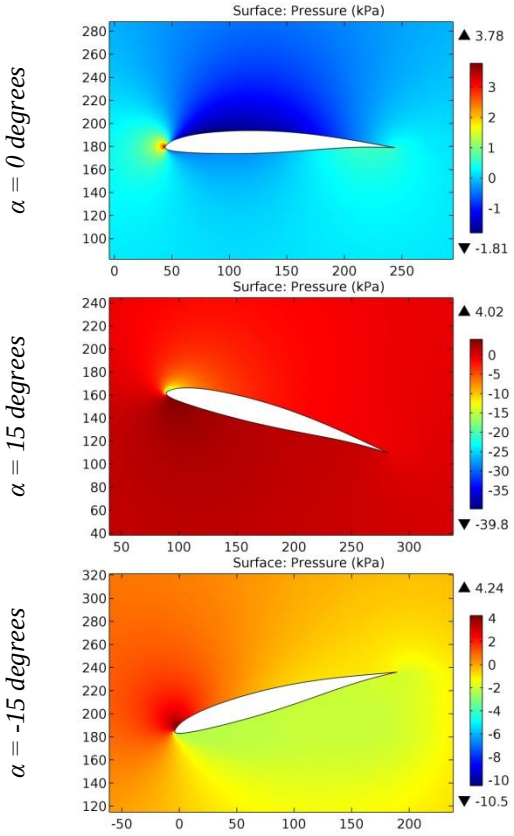


Figure 60. The pressure contours on the surfaces of the HQ 2,5-10 airfoil.

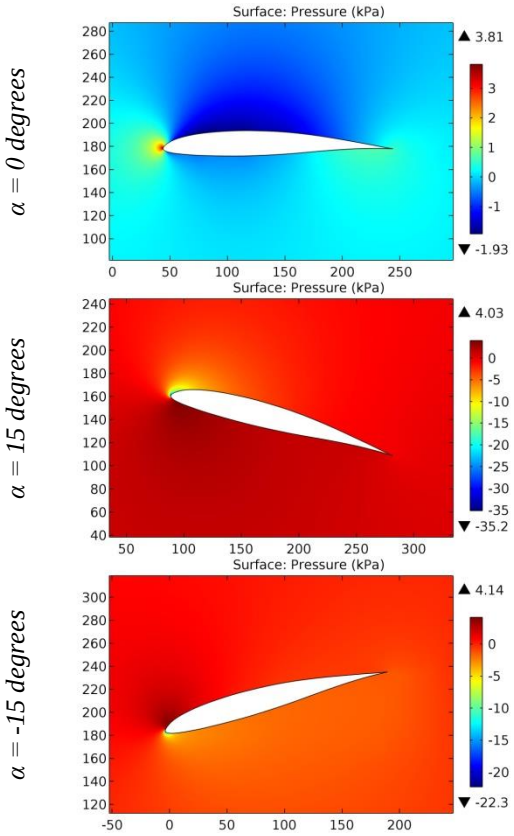


Figure 61. The pressure contours on the surfaces of the HQ 2,5-11 airfoil.

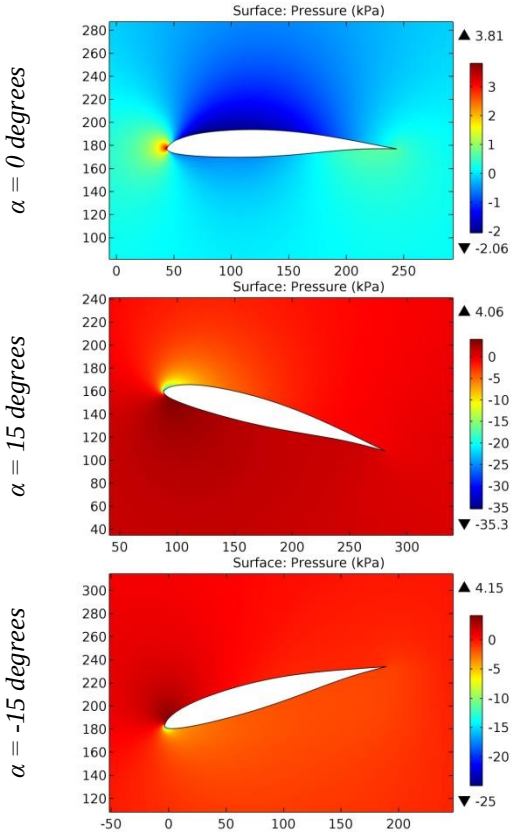


Figure 62. The pressure contours on the surfaces of the HQ 2,5-12 airfoil.

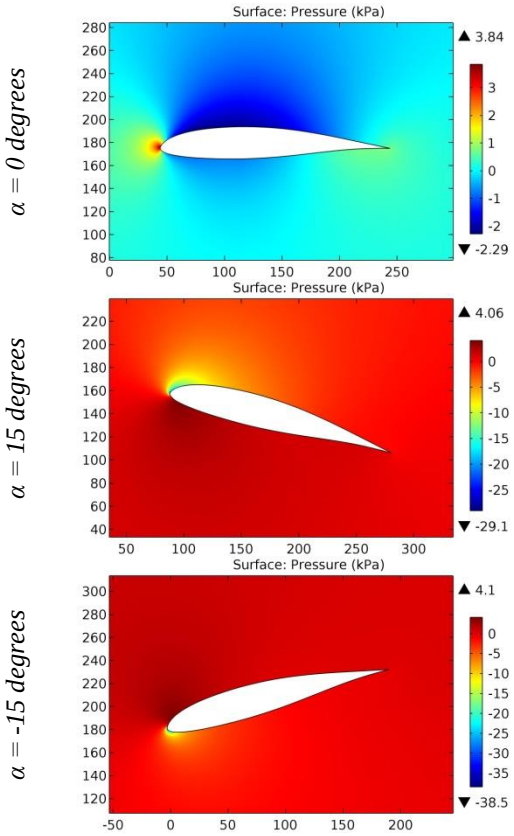


Figure 63. The pressure contours on the surfaces of the HQ 2,5-14 airfoil.

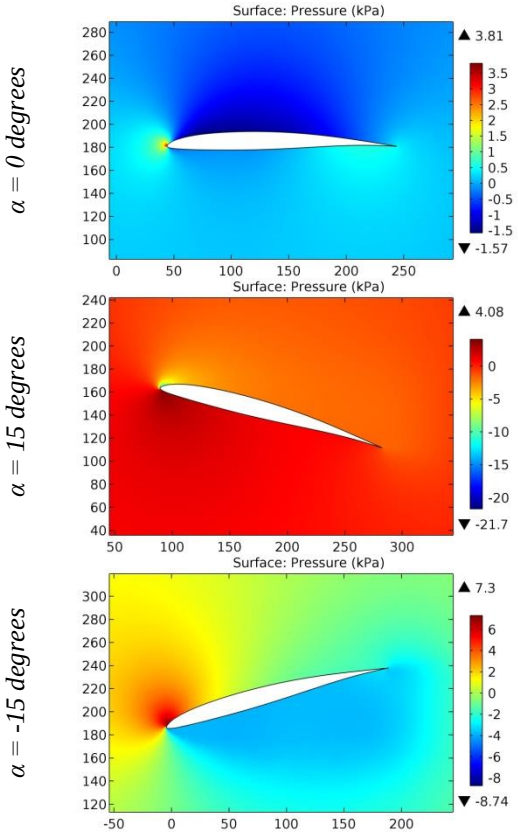


Figure 64. The pressure contours on the surfaces of the HQ 2,5-8 airfoil.

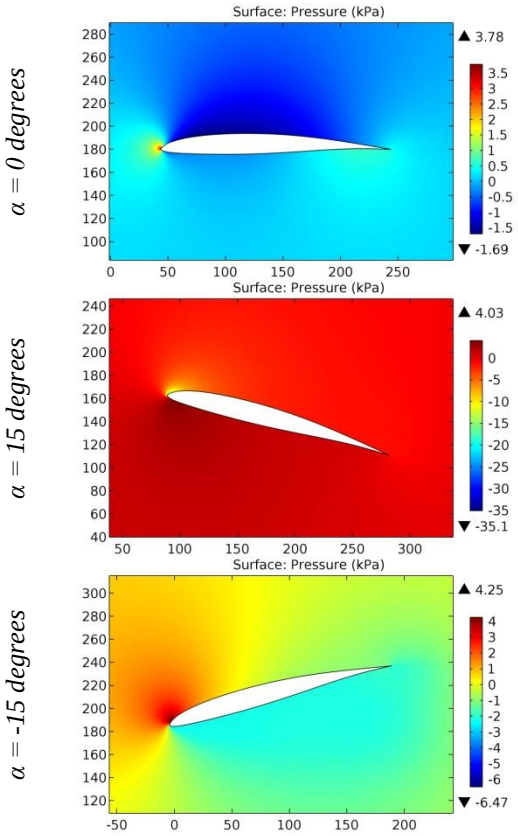


Figure 65. The pressure contours on the surfaces of the HQ 2,5-9 airfoil.

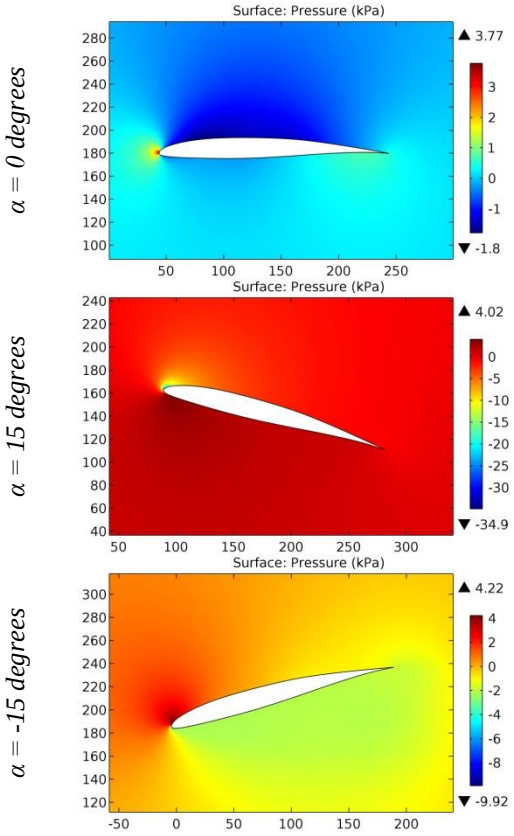


Figure 66. The pressure contours on the surfaces of the HQ 2,5-9 B airfoil.

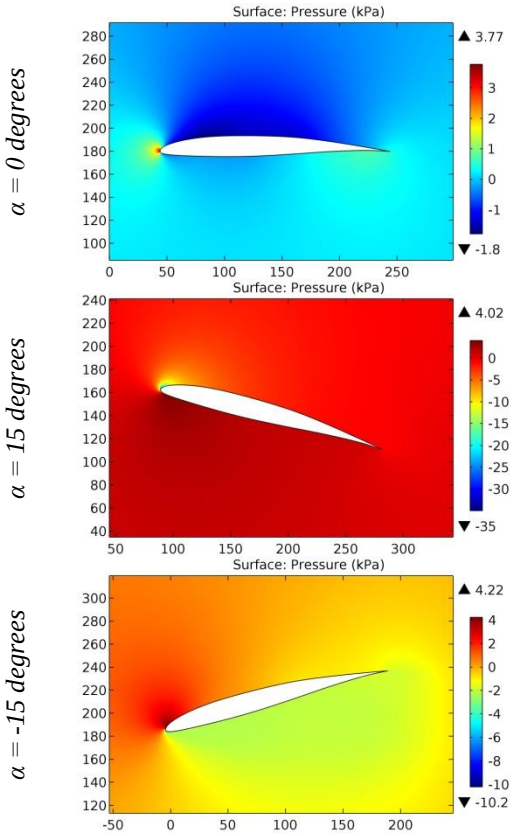


Figure 67. The pressure contours on the surfaces of the HQ 2,5-9,0 smoothed by Eppler airfoil.

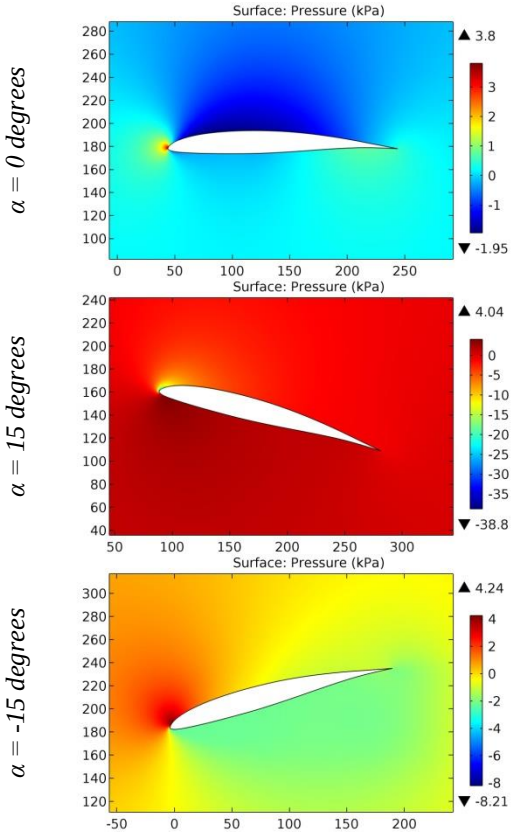


Figure 68. The pressure contours on the surfaces of the HQ 3,0-10 airfoil.

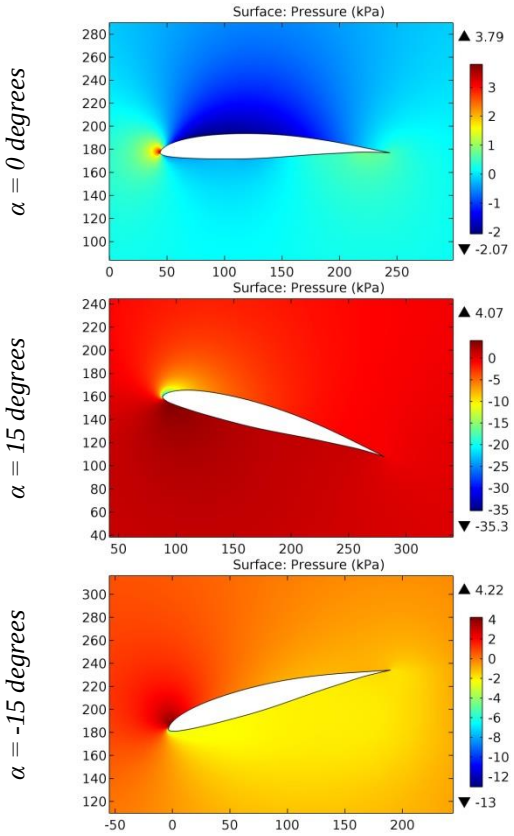


Figure 69. The pressure contours on the surfaces of the HQ 3,0-11 airfoil.

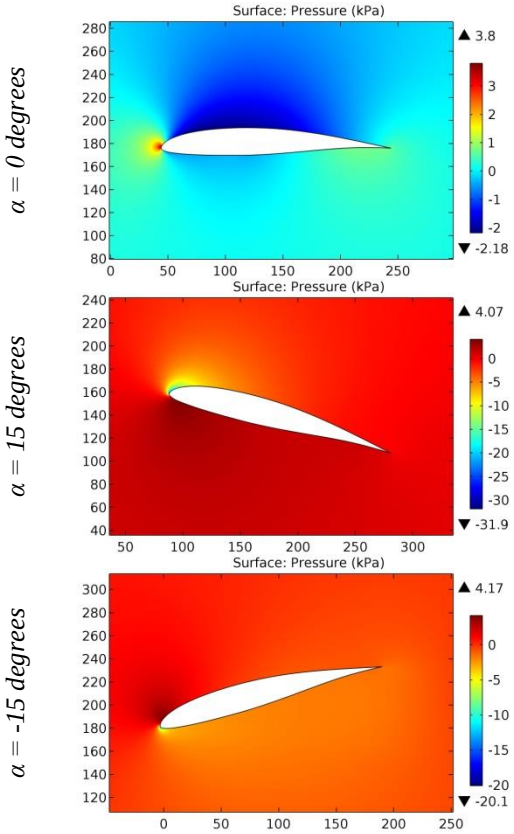


Figure 70. The pressure contours on the surfaces of the HQ 3,0-12 airfoil.

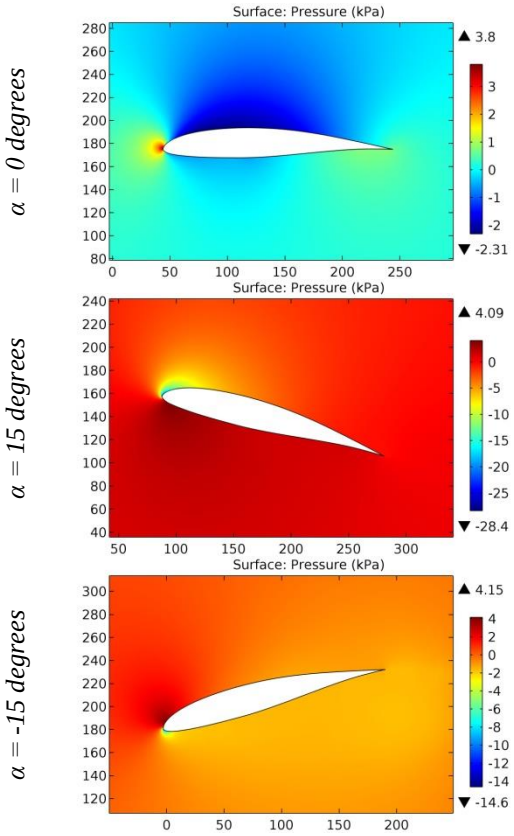


Figure 71. The pressure contours on the surfaces of the HQ 3,0-13 airfoil.

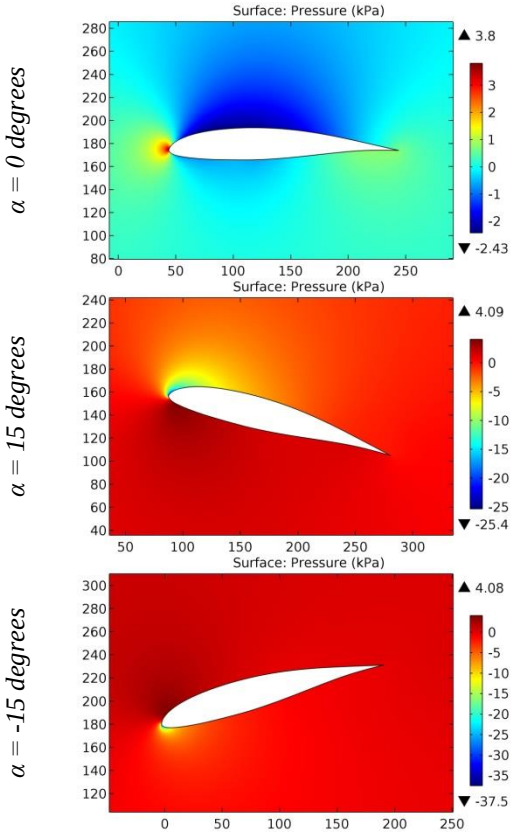


Figure 72. The pressure contours on the surfaces of the HQ 3,0-14 airfoil.

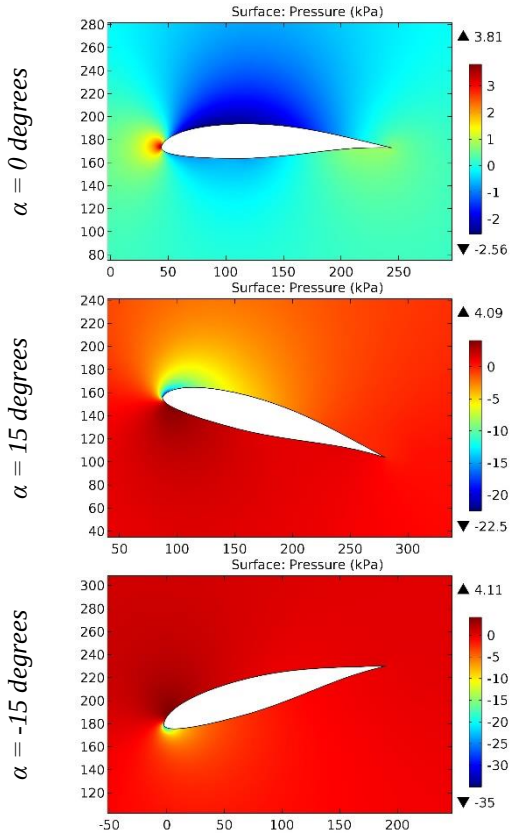


Figure 73. The pressure contours on the surfaces of the HQ 3,0-15 airfoil.

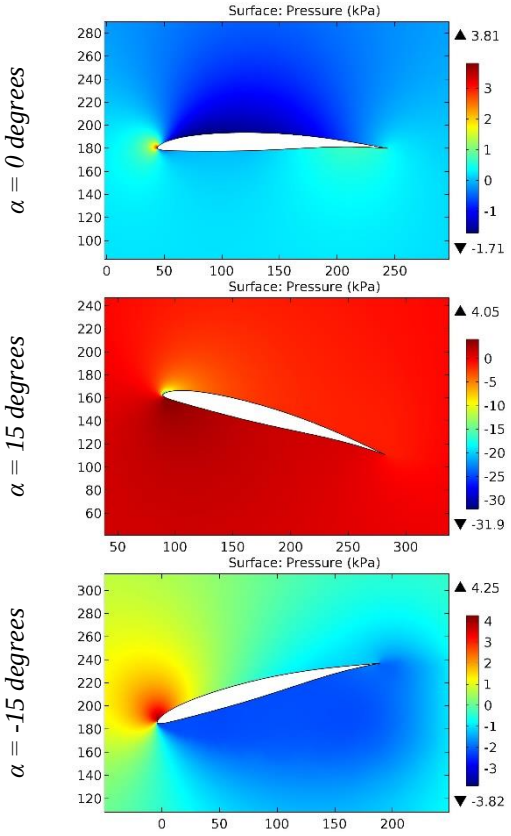


Figure 74. The pressure contours on the surfaces of the HQ 3,0-8 airfoil.

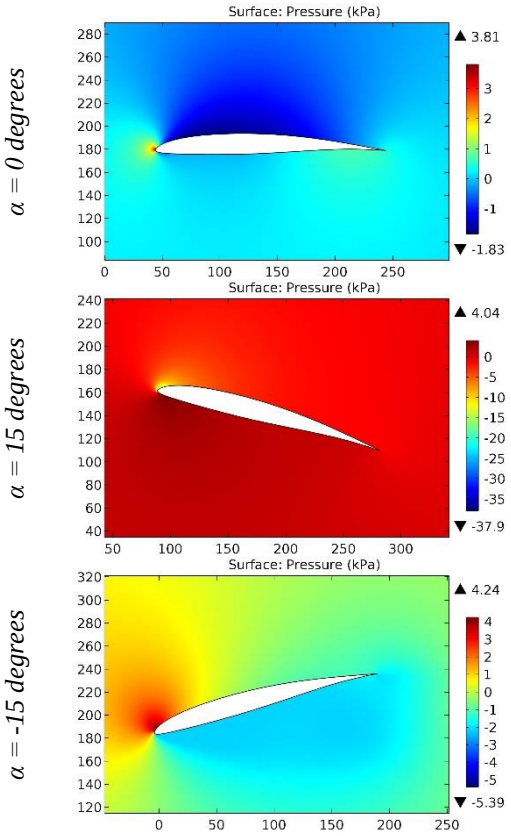


Figure 75. The pressure contours on the surfaces of the HQ 3,0-9 airfoil.

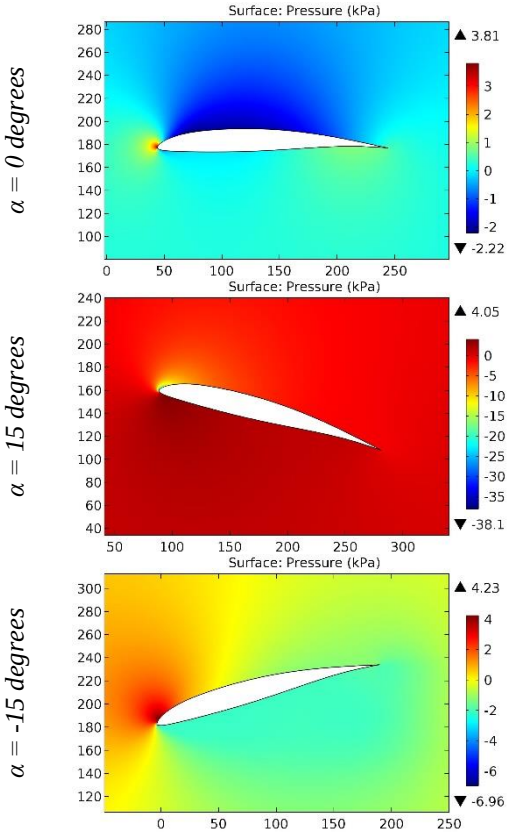


Figure 76. The pressure contours on the surfaces of the HQ 3,5-10 airfoil.

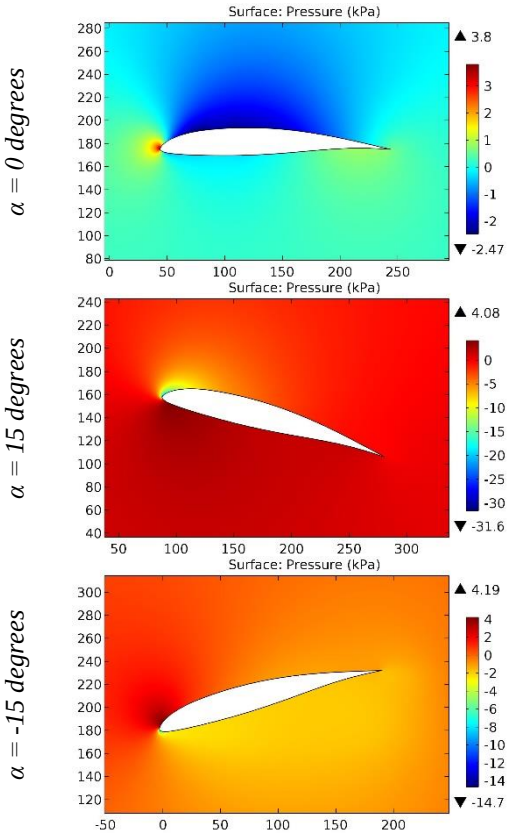


Figure 77. The pressure contours on the surfaces of the HQ 3,5-12 airfoil.

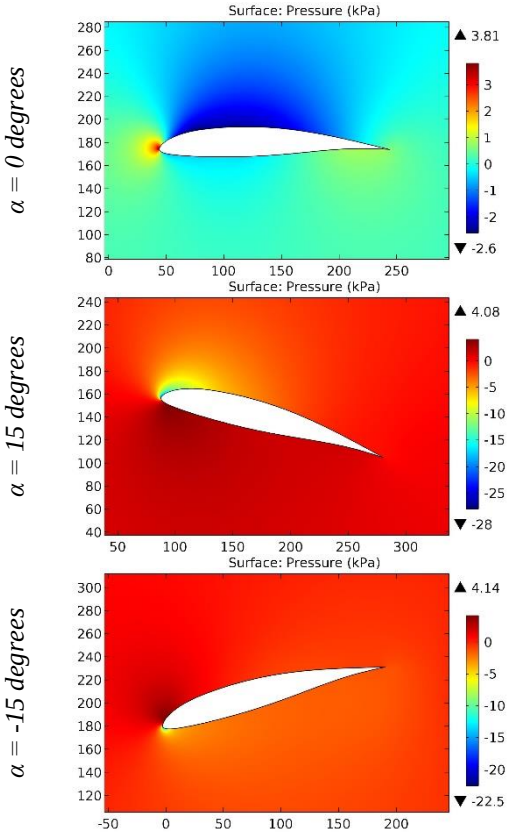


Figure 78. The pressure contours on the surfaces of the HQ 3,5-13 airfoil.

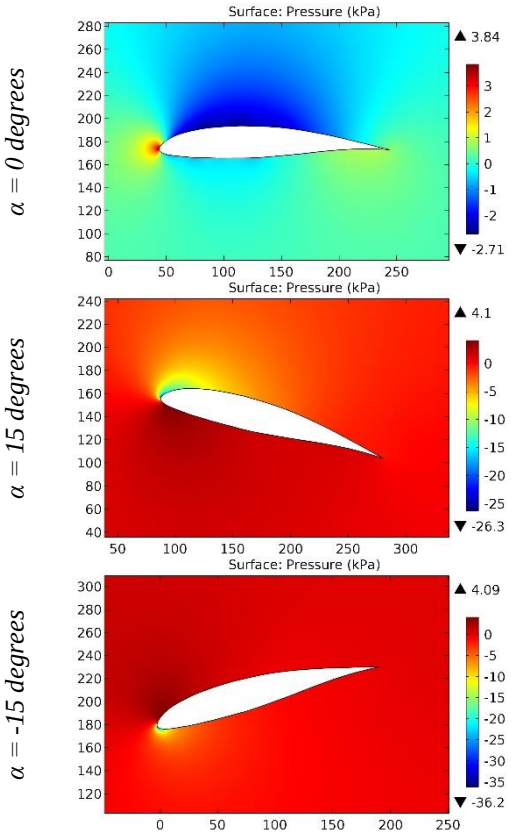


Figure 79. The pressure contours on the surfaces of the HQ 3,5-14 airfoil.

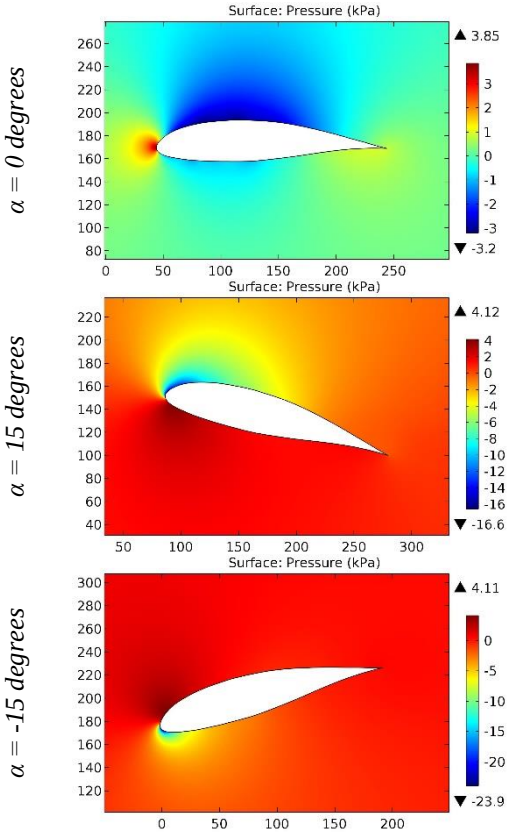


Figure 80. The pressure contours on the surfaces of the HQ 3,5-18 airfoil.

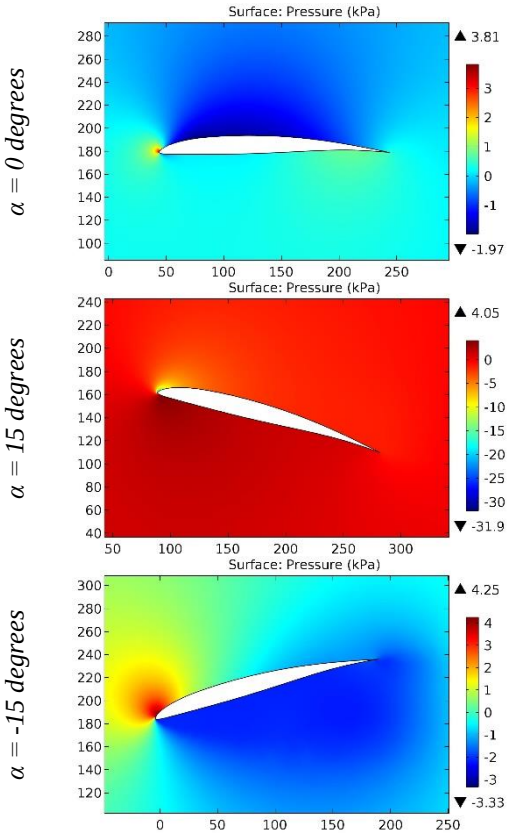


Figure 81. The pressure contours on the surfaces of the HQ 3,5-8 airfoil.

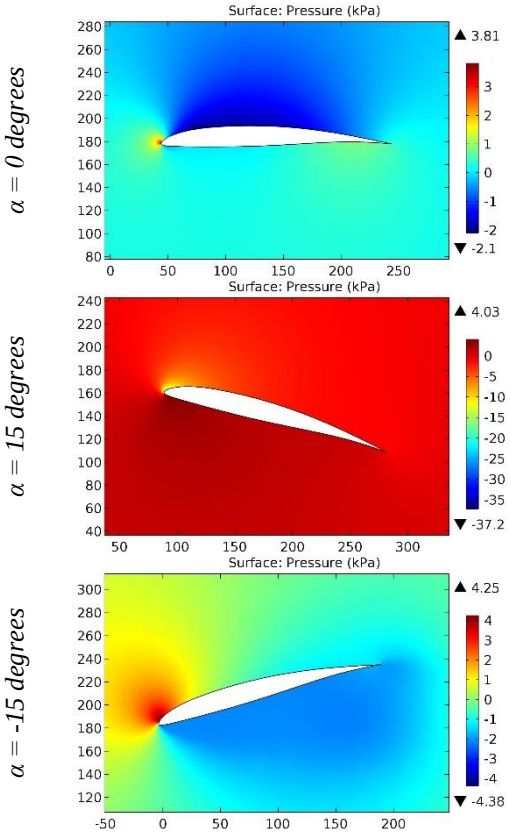


Figure 82. The pressure contours on the surfaces of the HQ 3,5-9 airfoil.

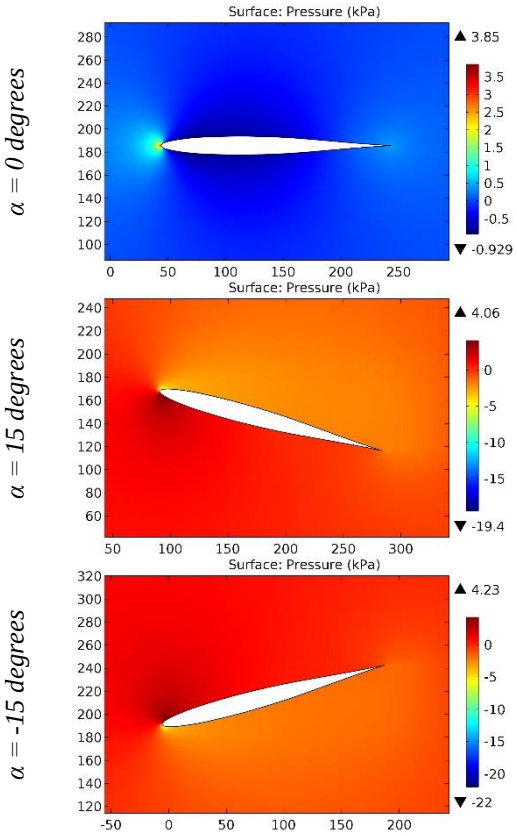


Figure 83. The pressure contours on the surfaces of the HQ-00-09 airfoil.

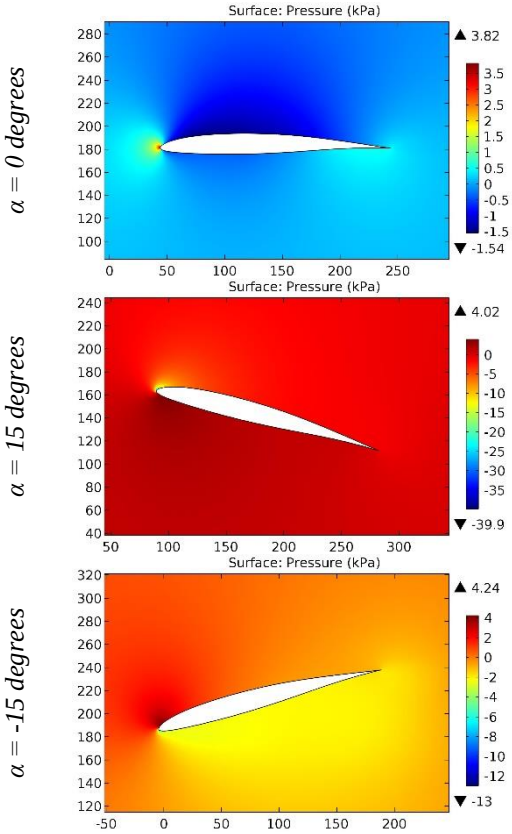


Figure 84. The pressure contours on the surfaces of the HQ-2,0-9 9,0% smoothed airfoil.

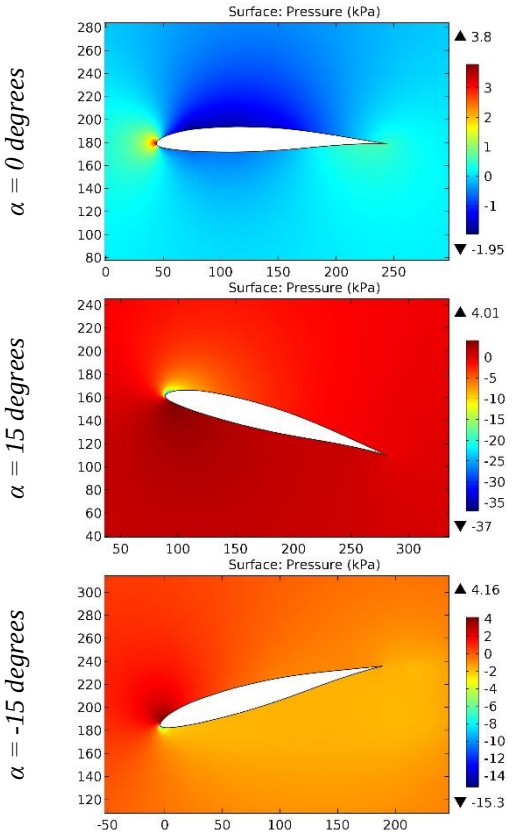


Figure 85. The pressure contours on the surfaces of the HQ-20-11 airfoil.

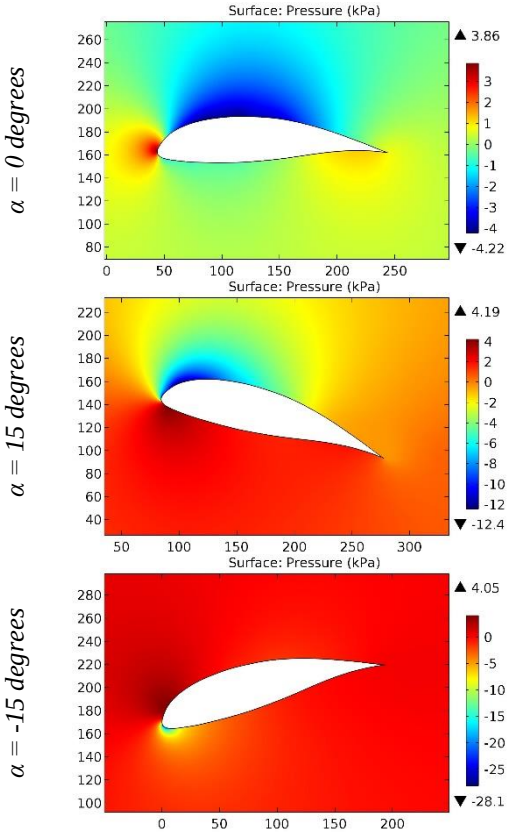


Figure 86. The pressure contours on the surfaces of the HQ-60-20 airfoil.

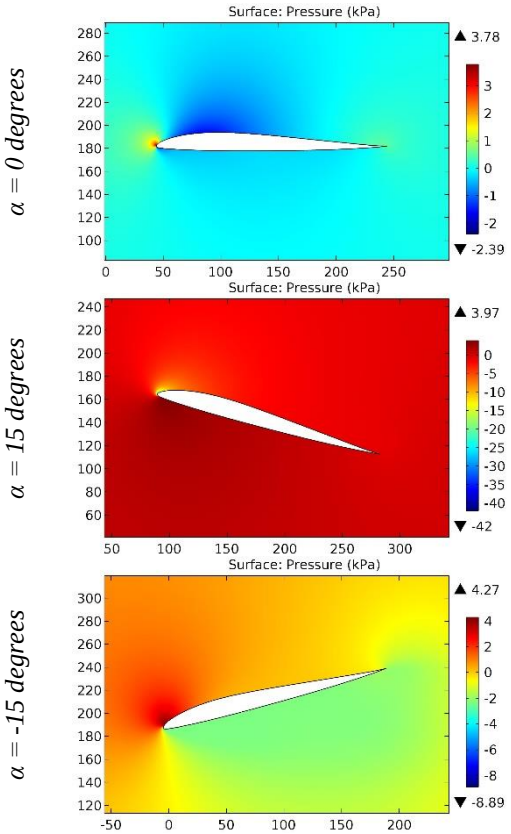


Figure 87. The pressure contours on the surfaces of the HS 2.0/8.0 airfoil.

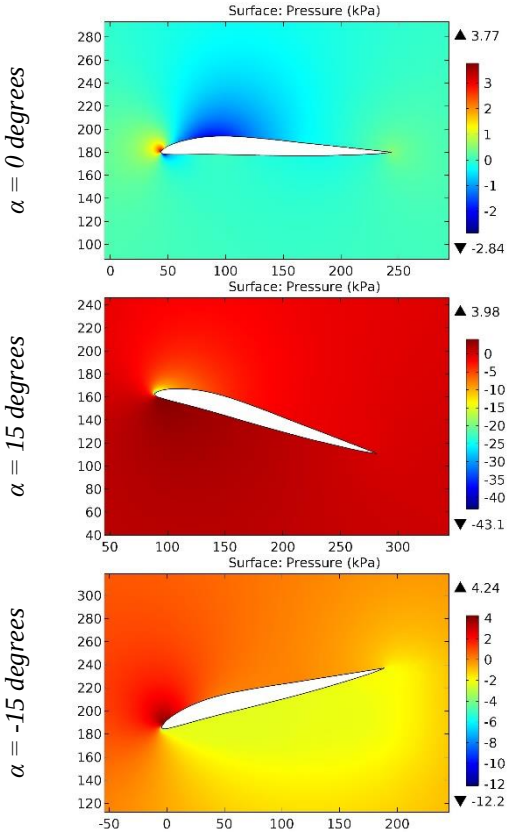


Figure 88. The pressure contours on the surfaces of the HS 3.0/8 airfoil.

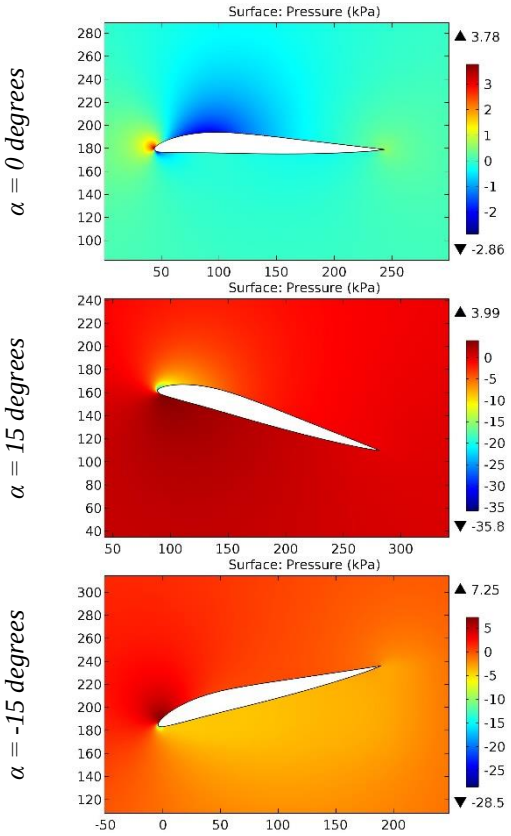


Figure 89. The pressure contours on the surfaces of the HS 3.0/9.0 airfoil.

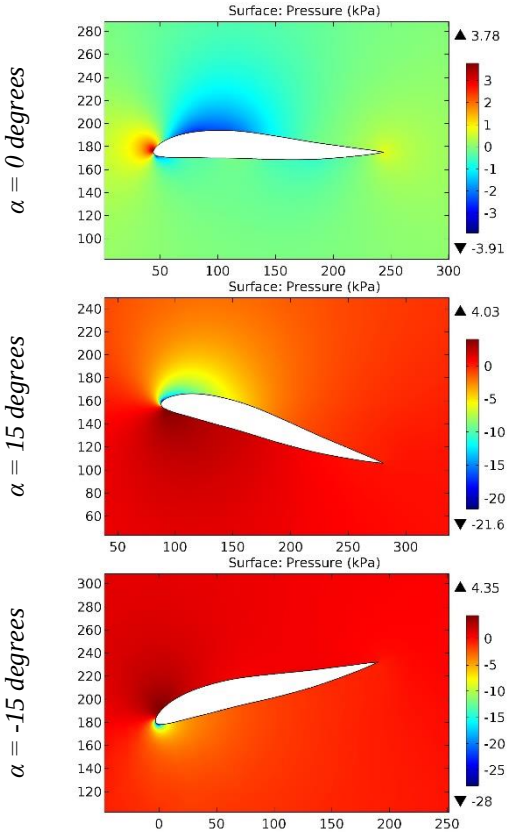


Figure 90. The pressure contours on the surfaces of the HS 3.5/12 airfoil.

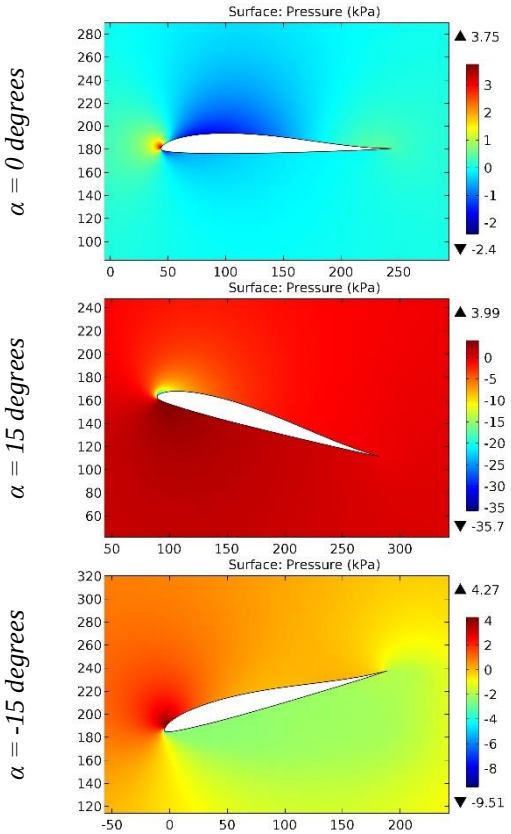


Figure 91. The pressure contours on the surfaces of the HS 510 airfoil.

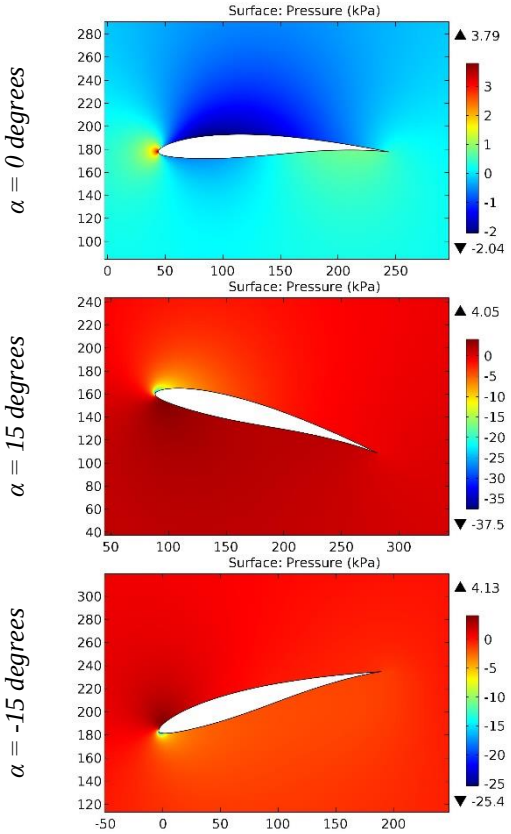


Figure 92. The pressure contours on the surfaces of the HS 602 airfoil.

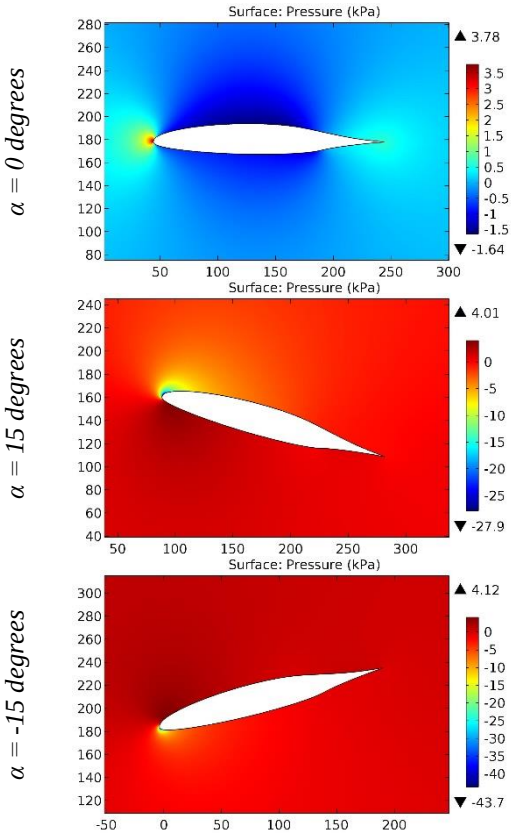


Figure 93. The pressure contours on the surfaces of the HSNLF(1)-0213 airfoil.

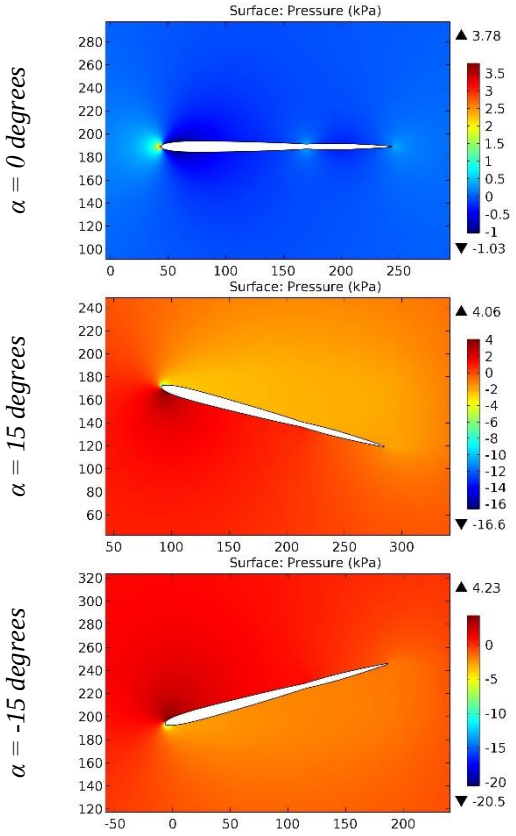


Figure 94. The pressure contours on the surfaces of the HT 05 airfoil.

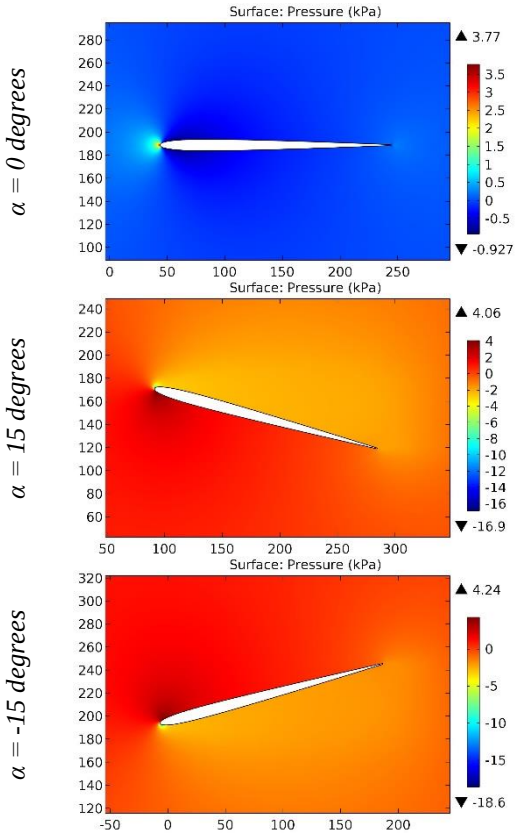


Figure 95. The pressure contours on the surfaces of the HT 08 airfoil.

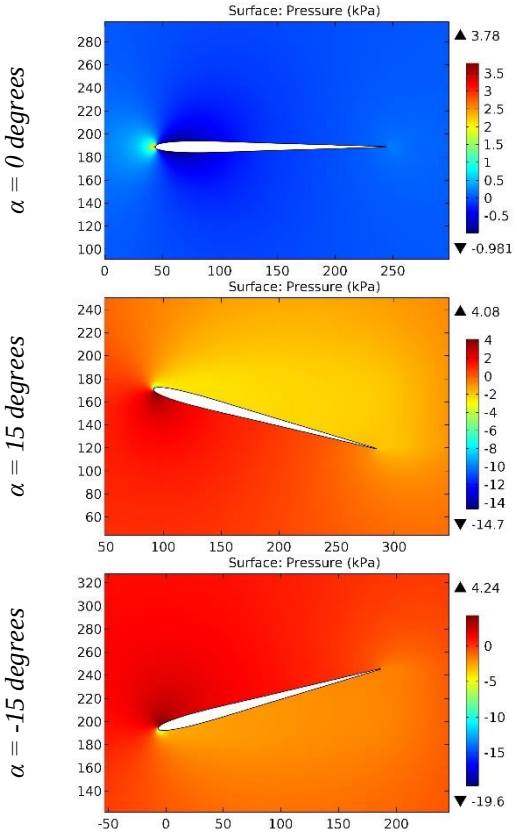


Figure 96. The pressure contours on the surfaces of the HT 12 airfoil.

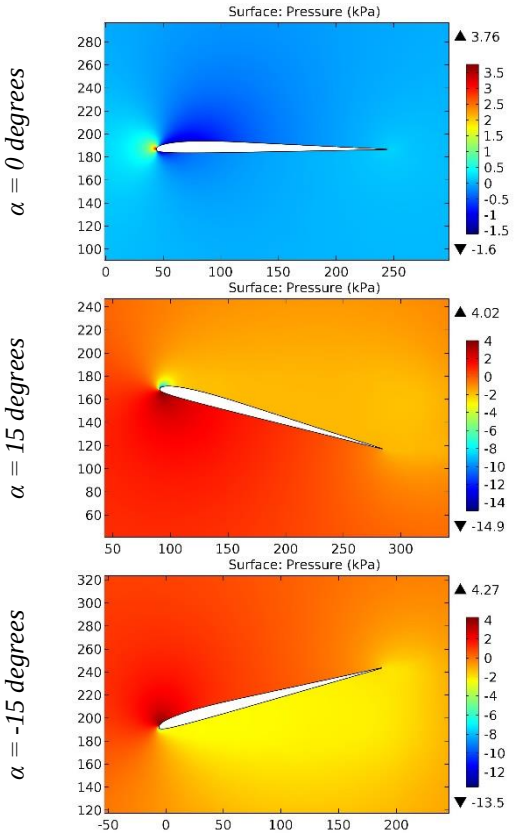


Figure 97. The pressure contours on the surfaces of the HT22 airfoil.

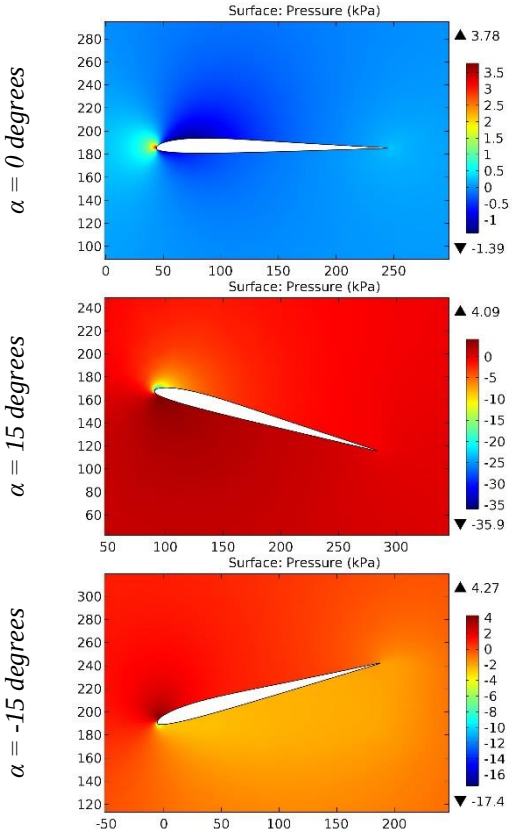


Figure 98. The pressure contours on the surfaces of the HT23 airfoil.

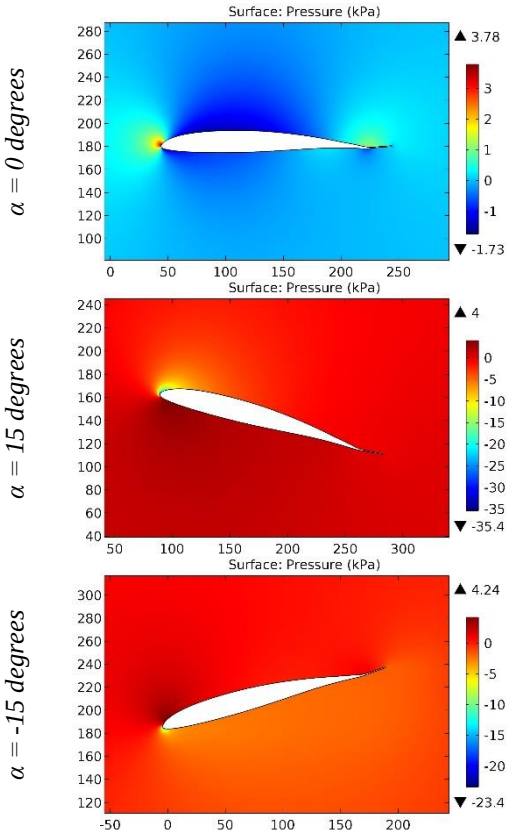


Figure 99. The pressure contours on the surfaces of the HUGHES HELICOPTERS HH-02 airfoil.

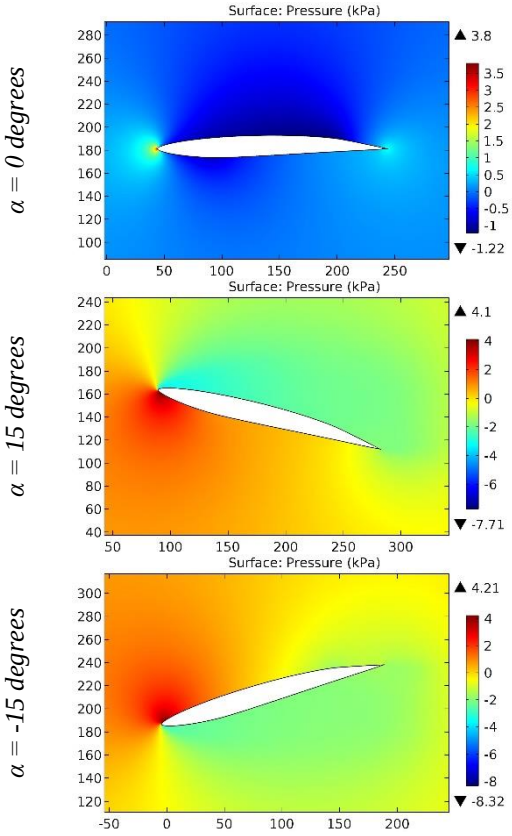


Figure 100. The pressure contours on the surfaces of the hydrofoil"Profile 915".

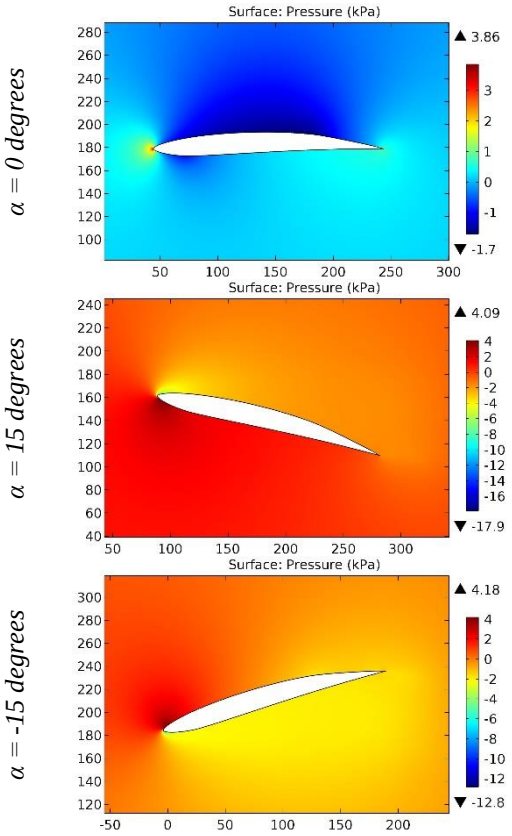


Figure 101. The pressure contours on the surfaces of the hydrofoil"Profile 930".

The values of the drag on the leading edge of the airfoils of asymmetrical geometric shapes were determined. The highest drag coefficient was calculated for the HN-956 airfoil among them. The value was calculated at the angle of attack of 0 degrees. The HO1U airfoil has the lowest drag coefficient during horizontal flight of the airplane. Thus, the decrease in the drag coefficient for the considered asymmetrical airfoils is about 25%. Similarly, the drag coefficient reduction of 2.5% was determined among the symmetrical airfoils with the maximum drag (HQ 0-7, pressure was 3.87 kPa) and the minimum drag (HN-976S, HT 05 and HT 12, pressure was 3.78 kPa).

Analyzing the simulation data, it was noted that for the HO1U airfoil, the value of the drag coefficient practically does not change during the descent and the climb of the airplane and is the minimum of all the airfoils considered above.

The maximum difference in the drag coefficient during the airplane maneuvers is observed for the HSNLF(1)-0213 airfoil. The drag increases by 1.56 times during the descent of the airplane.

Let us consider the HORSTMANN AND QUAST HQ-300 GD(MOD 2) and HUGHES HELICOPTERS HH-02 airfoils during horizontal flight of the airplane and the helicopter. These airfoils have a clockwise and counterclockwise curvature of the trailing edge. In the area of the curvature, positive air flow pressure of the greater value is formed than on the rest of the contour of the airfoil. The pressure difference is not observed during the airplane maneuvers.

Conclusion

The analysis of the calculation results showed that the change in the drag coefficient for the considered asymmetrical and symmetrical airfoils differs by the factor of 10. The significant part of the airfoils and hydrofoils during the climb of the airplane has the large lifting force, which is confirmed by the large difference in positive and negative pressures on the upper and lower surfaces.

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SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2022 **Issue:** 05 **Volume:** 109

Published: 21.05.2022 **http://T-Science.org**

Issue Article

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FOCUS ON REGIONAL COOPERATION BETWEEN UZBEKISTAN AND AZERBAIJAN

Abstract: *The article traces the causes and prerequisites for integration processes in Central Asia and the South Caucasus. Also, the main emphasis is placed on the place and role of the Republic of Uzbekistan and the Republic of Azerbaijan in normalizing relations with their immediate neighbors, establishing a new constructive dialogue between them, as well as creating a security belt around the Central Asian and South Caucasian regions.*

Key words: *Uzbekistan, Azerbaijan, Central Asia, South Caucasus, regional cooperation.*

Language: *Russian*

Citation: Adygezalov, A. N. (2022). Focus on regional cooperation between Uzbekistan and Azerbaijan. *ISJ Theoretical & Applied Science, 05 (109),* 587-592.

Soi: http://s-o-i.org/1.1/TAS-05-109-58 ***Doi***: https://dx.doi.org/10.15863/TAS.2022.05.109.58

Scopus ASCC: *3320.*

АКЦЕНТ НА РЕГИОНАЛЬНОЕ СОТРУДНИЧЕСТВО УЗБЕКИСТАНА И АЗЕРБАЙДЖАНА

Аннотация: *В статье прослеживаются причины и предпосылки интеграционных процессов в Центральной Азии и Южном Кавказе. Также основной акцент делается месту и роли Республики Узбекистан и Азербайджанской Республики в нормализации отношений со своими непосредственными соседями, налаживанию нового конструктивного диалога между ними, а также созданию пояса безопасности вокруг Центральноазиатского и Южнокавказского регионов.*

Ключевые слова: *Узбекистан, Азербайджан, Центральная Азия, Южный Кавказ, региональное сотрудничество.*

Введение

Республика Узбекистан и Азербайджанская Республика за годы независимого политического развития столкнулись с идентичными проблемами развала СССР, трудностями и последствиями ликвидации единой хозяйственной системы советского государства, некоторой внутренней и внешней нестабильностью, вспышками этнических конфликтов (Азербайджан до сих пор вовлечен в Нагорно-Карабахскую войну) несмотря на все эти сложности переходного периода оба государства сумели их нейтрализовать.

Обе страны основной прерогативой в выработке и реализации внешне- и внутриполитического курса избрали четкое конструктивное понимание своего места в мире и регионе, формулирование и отстаивание своих национальных интересов.

Важнейшей стратегической задачей внешнеполитического курса Узбекистана и Азербайджана является нормализация отношений со своими непосредственными соседями, а также создание пояса безопасности вокруг Центральноазиатского и Южнокавказского регионов.

Узбекистан – катализатор формирования нового Центральноазиатского регионального климата

В Центральной Азии во многом благодаря усилиям Ташкента появилась возможность формирования новой геополитической реальности и структуры безопасности. Их практическая реализация стала возможна бла-

годаря дальновидной и взвешенной политике Президента Узбекистана Ш.М. Мирзиёева. По средствам распространения межрелигиозного и межконфессионального согласия и терпимости в регионе, новое руководство Узбекистана придает особое значение качеству двусторонних отношений Узбекистана с его соседями: Казахстаном, Кыргызстаном, Таджикистаном и Туркменистаном.

Первыми шагами, предпринятыми Узбекистаном в рамках изменения своей региональной политики в сторону ее активизации, стали действия, направленные на нормализацию отношений с Кыргызстаном и Таджикистаном. До 2017 года отношения Ташкента с этими двумя странами были отягощены целым комплексом проблемных точек.

Отношения с Бишкеком осложнялись как последствиями межэтнического конфликта в Кыргызстане 2010 года, основными жертвами которого стали этнические узбеки, проживающие в южных регионах этой республики, так и нерешенностью пограничных вопросов. Тем не менее, уже в сентябре 2017 году между Кыргызстаном и Узбекистаном был подписан Договор об узбекско-кыргызской государственной границе, было согласовано около 85% государственной границы, сняты ограничения с ряда контрольно-пропускных пунктов [1]. Решение по пограничным вопросам рассматривается Кыргызстаном и Узбекистаном как комплексная задача, включающая в себя не только делимитацию границы, но и сотрудничество в таких направлениях, как использование водных и энергетических ресурсов, развитие приграничных областей и межрегиональное сотрудничество, развитие транспортной инфраструктуры, в частности – мультимодального коридора Ташкент–Андижан–Ош–Иркештам–Кашгар. Показателем нормализации отношений между двумя странами стало первое в истории кыргызско-узбекских отношений участие кыргызской делегации на выборах в Законодательную палату Олий Мажлис Республики Узбекистан в декабре 2019 года в качестве международных наблюдателей [2].

Сходные темпы выстраивания двусторонних отношений наблюдаются и между Таджикистаном и Узбекистаном. Если ранее между соседними республиками действовал визовый режим и не было практически никакого прямого сообщения, за исключением приграничного, то уже в 2017 году были возобновлены авиарейсы между Душанбе и Ташкентом, восстановлена железная дорога Галаба–Амузанг, была открыта международная автомобильная дорога на участке Самарканд–Пенджикент, возобновил работу ряд пунктов пропуска на таджикско-узбекской границе. В 2018 году было достигнуто соглашение о возобновлении поставок узбекского газа в Таджикистан, также был подписан Договор об отдельных участках узбекско-таджикской государственной госграницы, который позволил сторонам почти полностью согласовать ранее неделимитированные участки границы. Одним из прорывных стало решение территориального спора вокруг Фархадской ГЭС.

Хотя двусторонние отношения между Узбекистаном, с одной стороны, Казахстаном и Туркменистаном с другой, не имели сложностей, сравнимых с отношениями с Кыргызстаном и Таджикистаном, и на протяжении всех годов независимости развивались поступательно, начиная с 2017 года здесь фиксируется активизация сотрудничества. Так, стратегическое партнерство Узбекистана и Казахстана, закрепленное соответствующим двусторонним договором в 2013 году, после 2017 года перешло на практический уровень, когда регулярные контакты лидеров двух государств стали подкрепляться активизацией сотрудничества экономического, социального и культурного плана [2].

Активная региональная стратегия Узбекистана создала благоприятный дипломатический климат между Центральноазиатскими странами. Инициатива Президента Ш. Мирзиёева на Генеральной Ассамблее ООН в сентябре 2017 года о проведении консультативных встреч лидеров стран Центральной Азии была поддержана его коллегами. На сегодняшний день уже состоялись три консультативные встречи: в Астане (март 2018 года), в Ташкенте (ноябрь 2019 года) и в Туркменбаши (август 2021 года).

Результатами консультативных встреч глав государств Центральной Азии стали:

- превращение Центральной Азии в единую торгово-инвестиционную и транспортно-коммуникационную площадку;
- начало реализации проектов промышленной кооперации;
- создание совместных инвестиционных компаний и фондов;
- осуществление транспортно-транзитной интеграции;
- расширение приграничной торговли;
- увеличение масштабов культурно-гуманитарного сотрудничества.

Благодаря открытой и прагматичной политике Узбекистана в отношении стран Центральной Азии, были возобновлены региональные связи и открыты границы; восстановлены и обогатились новыми направлениями воздушные, автобусные и железнодорожные маршруты; также были облегчены связи между людьми, что, в свою

очередь, способствовало развитию региональных экономических и торговых отношений. В результате уровень двустороннего и многостороннего сотрудничества в регионе заметно повысился [3]. В частности, за 2017–2019 годы средний годовой товарооборот со странами Центральной Азии вырос более чем на 50% и составил 5,2 млрд долларов США. По итогам 2020 года, несмотря на глобальную пандемию, общий товарооборот Узбекистана со странами Центральной Азии составил 5 миллиардов долларов. В частности, доля стран Центральной Азии в общем внешнеторговом обороте Узбекистана увеличилась с 12,4% в 2019 году до 13,6% в 2020 году, из которого на Казахстан приходится 61%, Киргизия – 18,2%, Туркменистан – 10,6% и Таджикистан – 10,2%.

Такое улучшение торгово-экономических отношений между странами Центральной Азии в целом способствовало повышению инвестиционной привлекательности региона. В частности, в период с 2017 по 2020 год между Узбекистаном и странами региона были подписаны более 300 договоров, а также контрактов и соглашений на сумму около 75 млрд долларов [4].

Одновременно в силу определенных факторов, страны Центральной Азии отличаются друг от друга разными торговыми режимами, влияющими и препятствующими более интенсивному сотрудничеству и взаимодействию между ними [5].

Нынешнее состояние торговых режимов выглядит следующим образом:

– Казахстан и Кыргызстан, как члены Евразийского экономического союза, пользуются общим таможенным пространством;

– Казахстан, Кыргызстан и Таджикистан являются членами Всемирной торговой организации;

– Страны Центральной Азии (за исключением Туркменистана) входят в зону свободной торговли Содружества Независимых Государств (СНГ).

Несмотря на то, что страны Центральной Азии практикуют двусторонние соглашения о регулировании и стимулировании взаимной торговли, существует высокий спрос на объединение межрегиональных торговых режимов и экономических отношений, что впоследствии будет способствовать углублению регионального торгово-экономического сотрудничества.

С этой точки зрения, региональные трансграничные инициативы и проекты, такие как Международный центр торгово-экономического сотрудничества «Центральная Азия» (ICTEC) между Узбекистаном и Казахстаном, Программа регионального экономического сотрудничества Центральной Азии (ЦАРЭС), Центральноазиатское инвестиционное партнерство, имеют потенциал для улучшения и стимулирования двусторонних торгово-экономических отношений и поддержки многосторонних усилий по укреплению регионального взаимодействия и сотрудничества [3].

В качестве еще одного примера регионального сотрудничества следует отметить борьбу с COVID-19. Так, в начале глобальной пандемии руководство Узбекистана продемонстрировало свою приверженность региональному сотрудничеству и призвало к совместному реагированию на пандемию COVID-19 в Центральной Азии. Страны Центральной Азии поддерживали обмен опытом и информацией по борьбе с коронавирусной инфекцией, демонстрируя региональную солидарность в борьбе с общими задачами. Гуманитарная помощь из Узбекистана в Кыргызстан и Таджикистан, а затем из Казахстана в Кыргызстан, способствовала региональному сотрудничеству и его преимуществам [3].

Афганистан – неотъемлемая часть Центральноазиатского региона

Вместе с тем, Узбекистан отстаивает позицию, что Центральноазиатская безопасность и идентичность невозможна без стабилизации и нормализации ситуации в Афганистане, его интеграции в региональные экономические процессы. Так, в своем выступлении на Международной конференции в Самарканде 10 ноября 2017 года Президент Узбекистана Шавкат Мирзиёев высказал глубокую мысль: «Одна из первоочередных задач – всестороннее содействие интеграции Афганистана в региональные экономические процессы. Это станет важнейшим вкладом в усилия мирового сообщества по обеспечению мирного развития в Афганистане. Узбекистан продолжит активное участие в экономическом восстановлении соседней страны, развитии ее транспортной и энергетической инфраструктуры, подготовки ее национальных кадров» [6].

Еще одним шагом в направлении урегулирования афганской проблемы со стороны Узбекистана можно считать 2018 год, когда 26-27 марта в Ташкенте состоялась международная конференция «Мирный процесс, сотрудничество в области безопасности и региональное взаимодействие», в которой приняли участие представители 21 страны, Организации Объединенных Наций, Европейского Союза и других международных организаций. Принятая Ташкентская декларация была признана решением глобальных угроз. Президент Узбекистана Шавкат Мирзиёев «…обратил внимание на развитие дружественных отношений

между Узбекистаном и Афганистаном, на вовлечение Афганистана в систему торгово-экономических, транспортных коммуникационных, культурных и гуманитарных связей. Конечно, такого рода отношения с Афганистаном принципиально отличаются от предыдущих, и это означает, что они не только используют декларативные аспекты и дипломатию для установления мира в Афганистане, но и обеспечивают их экономическими и финансовыми ресурсами. В своем выступлении глава государства отметил, что пришло время взглянуть на Афганистан как на страну, которая не угрожает миру и стабильности и выдвинул предложения по укреплению безопасности и стабильности в этой стране, строительству автомобильных и железных дорог, прокладке трубопроводов для природных ресурсов, и созданию благоприятных условий для региональной и трансграничной торговли» [7, с. 81-82].

Очередным шагом в направлении стабилизации обстановки в Афганистане, его присоединении к процессам региональных и межрегиональных отношений стала Международная конференция «Центральная и Южная Азия: региональная взаимосвязанность. Вызовы и возможности», прошедшая в Ташкенте в июле 2021 года, в которой приняли участие более 250 участников из более чем 40 стран, в том числе, и из Афганистана. В ходе заседания были рассмотрены состояние и перспективы развития межрегионального сотрудничества в Центральной и Южной Азии, успешные примеры взаимодействия, перспективные инфраструктурные проекты взаимосвязанности.

Однако, стремительные события августа 2021 года привели в некоторое замешательство мировое сообщество. Так, в результате вывода войск США из Афганистана, и побега легитимного лидера страны Ашрафа Гани, к власти в Афганистане пришли талибы.

Даже в таких не простых и неоднозначных реалиях руководство Узбекистана во главе с Ш.М. Мирзиёевым показало свою готовность к конструктивному диалогу с новым руководством Афганистана. Так, на юбилейном саммите ШОС, состоявшемся в Душанбе президент Узбекистана Шавкат Мирзиёев предложил проводить встречи высокого уровня в формате «ШОС - Афганистан» для обсуждения кризисных вопросов в регионе. Кроме этого, с движением Талибан были установлены контакты. Министр иностранных дел Республики Узбекистан А.Х. Камилов отметил, что он не считает движение Талибан террористическим движением [8, с. 475].

Азербайджан - один из инициаторов интеграционных процессов Южнокавказского региона

Азербайджан также показывает свою приверженность безопасности и искреннего сотрудничества со своими соседями. Это было продемонстрировано в период активного давления на Иран в вопросе ядерной программы в 2006–2007 годах или же в процессе введения санкций в отношении России в 2014 году. В обоих случаях Азербайджан, несмотря на давление и угрозы, не предпринял шагов, наносящих урон добрососедским отношениям. Членство Азербайджана (с 2011 года) в Движении неприсоединения* создает благоприятную атмосферу во взаимоотношениях с соседями, которые имеют непростые взаимосвязи с различными военно-политическими блоками и открыто выступают против их расширения» [9, с. 12]. Только с Арменией у Азербайджана сохраняются напряженные отношения, вызванные Нагорно-Карабахским конфликтом.

Однако, несмотря, на этот конфликт, Азербайджан стремится развивать интеграционные процессы в Южнокавказском регионе. Так Азербайджан, после победы в конфликте вокруг Нагорного Карабаха и подписания 10 ноября 2020 года трехстороннего соглашения между президентами Азербайджана, России и Премьер-министром Армении, стремится возродить региональное развитие, причем, включить в этот процесс и Армению.

После окончания второй карабахской войны две страны прошли большой и в основном конструктивный путь к открытию транспортных путей и всеобъемлющему мирному урегулированию. Саммит лидеров Азербайджана, Армении и России 11 января 2021 года в Москве подтвердил желание сторон идти по этому пути и привел к созданию межправительственной рабочей группы для руководства процессом. Перед группой, возглавляемой вице-премьерами трех стран, была поставлена задача представить правительствам планы действий (в том числе графики реализации) по региональным железнодорожным и автодорожным проектам. Группа встречалась не менее десяти раз до следующего саммита лидеров стран, состоявшегося в Сочи 26 ноября.

На саммите в Сочи лидеры пришли к соглашению о возобновлении региональных транспортных связей, в том числе транзитного маршрута из Армении в Иран (через Нахичевань) и Россию (через основную территорию

* Движение неприсоединения – международная организация, объединяющая 120 государств мира на принципах неучастия в военных блоках, была создана на Белградской конференции в 1961 году бывшей Югославией, Индией и Египтом.

Азербайджан), а также о создании Зангезурского коридора.

Стороны достигли договоренности о перезапуске железных дорог на основе международно-признанных пограничных и таможенных правил, руководствуясь принципом взаимности, под суверенитетом и властью соответствующих стран. По действующему трехстороннему соглашению удалось достигнуть определенных результатов, касательно функционирования железнодорожной артерии между Азербайджаном и Арменией. Так, железная дорога будет проходить по маршруту Ерасх– Джульфа–Ордубад–Мегри–Горадиз, то есть с севера Армении до города Горадиз Физулинского района Азербайджана, проходя через Нахичевань и юг Армении.

Азербайджан начал строительство своего участка железной дороги от Горадиза до Агбенда (самый юго-западный город основной части Азербайджана) еще в феврале 2021 года. 25 января 2022 года Азербайджан заявил, что он проложил уже 23 километра железной дороги из 110,4 километра. Армения также начала работы по строительству своей части железнодорожных путей [10].

Если в деле налаживания железнодорожного ответвления Зангезурского коридора наметились определенные сдвиги, то в автомобильной ее составляющей – не все так просто. Дело в том, что стороны не могут прийти к компромиссу относительно статуса этой дороги. Так, Армения настаивает на без пошлинном автомобильном сообщении в Азербайджан, Азербайджан же воспринимает позицию Армении, как противоречащую трехстороннему заявлению от 10 ноября 2020 года.

Как подчеркивал Президент Азербайджана Ильхам Алиев: «…Правовой режим Зангезурского коридора, должен быть таким же, как и в Лачинском коридоре, потому что в трехстороннем заявлении открыто говорится о том, что Азербайджан обеспечивает безопасность и беспрепятственное сообщение между Карабахом и Арменией, а Армения должна обеспечить такое же беспрепятственное сообщение и безопасность между Азербайджаном и Нахчыванской Автономной Республикой. Таким образом, сегодня в Лачинском коридоре нет таможни. Поэтому ее не должно быть и в Зангезурском коридоре. Если Армения будет настаивать на использовании своих таможенных структур для контроля за грузами и людьми, то мы будем настаивать на том же в Лачинском коридоре. Это логично, и решение должна принять армянская сторона. Мы согласны на оба варианта: либо ни в одном из коридоров не должно быть таможни, либо она должна быть в обоих коридорах» [11].

Однако, на наш взгляд, скорейшему решению этого спора содействует выгодность транспортного сообщения, как для Азербайджана, так и для Армении, а также внешних региональных игроков - России, Турции, Ирана, Евросоюза и Китая. Так, для Азербайджана Зангезурский коридор – это кратчайший путь, соединяющий основную территорию страны с эксклавом Нахичевань и Турцией. В свою очередь, для Армении Зангезурский коридор - это возможность установить сообщение с Ираном через Нахичеванскую Автономную Республику, кроме того, этот маршрут послужит установлению транспортных и железнодорожных связей Армении с Россией, через территорию Азербайджана.

Итак, данный транзитный коридор будет также способствовать повышению потенциала Среднего коридора – мультимодального транспортного маршрута, соединяющего Европу с Китаем через Каспийское море и страны Центральноазиатского и Южнокавказского регионов. Для Армении открытие Зангезурского коридора также сулит превращению страны в логистический и транзитный центр для перевозки грузов внешними игроками, а благодаря интеграции в Средний коридор – Армения перестанет быть изолированной страной Южнокавказского региона.

Как мы видим, Зангезурский коридор – это интеграционная региональная площадка, способствующая не только обогащению экономик Азербайджана и Армении, но служащая интересам внерегиональных игроков. Так, например, для России и для Турции эта площадка позволит установить обоюдно выгодную стабильную наземную связь. Кроме того, данный коридор призван, не только связать экономики стран региона, но и способствовать их политическому сближению.

Примером дальнейшей интеграции региона, оживления экономики и вовлечения государств Южного Кавказа в данный процесс является предложение Президента Турции Р. Эрдогана о дальнейшем развитии региона на основании «Платформы 3+3». Президенты России В. Путин и Азербайджана И. Алиев поддержали инициативу турецкого лидера по созданию регионального механизма формата «3+3» для укрепления мира, стабильности и развития в регионе. Предполагается, что три государства Южного Кавказа (Азербайджан, Армения, Грузия) и три региональных соседа (Россия, Турция, Иран) могут сотрудничать во благо региона [12, с. 177].

Реализация этих экономических и политических проектов принесет мир и стабильность на Южный Кавказ после неспокойных лет армяно-азербайджанского

конфликта. Однако этот процесс не свободен от вызовов и угроз. Будущее региона и судьба региональных проектов, предложенных после Карабахской войны, неразрывно связаны с успехом армяно-азербайджанского мирного процесса и полной реализацией трехстороннего заявления от 10 ноября 2020 года. Вывод незаконных формирований ВС Армении из карабахского региона, начало процесса делимитации и демаркации границы и признание Арменией и Азербайджаном территориальной целостности друг друга являются предпосылками для устойчивого мира и безопасности в регионе и для успешного осуществления таких проектов, как Зангезурский коридор и платформа регионального сотрудничества «3+3» [10].

Заключение

Итак, за последние несколько лет, как Республика Узбекистан, так и Азербайджанская Республика стремятся наладить и развить региональное сотрудничество, что приобретает на сегодняшний день особое актуальное значение. Идентичность взглядов на развитие региональных интеграционных процессов обусловлена глубо взвешенной и обдуманной политикой руководств двух стран, во главе с Шавкатом Мирзиёевым и Ильхамом Алиевым, что в немалой степени способствовало обеспечению главенствующего положения Узбекистана и Азербайджана, соответственно, в Центральноазиатском и Южнокавказском регионах.

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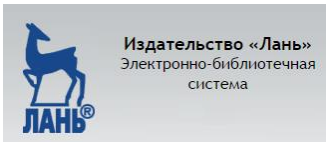

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