

<b>Project name, IRN</b>	AP25794879 – Recycling of plastic film waste as a binder for the production of reed-layered building material
<b>Completion date</b>	02.05.2025-31.12.2027
<b>Project supervisor</b>	Abilkhair Issakulov, PhD
<b>Report</b>	<p>The project refers to the technology of industrial ecology, solid waste processing and production of building materials. With the growth of well-being, the country's population increases its purchasing power in various consumer goods, movable and immovable property, as well as food products, respectively. For the transportation of all goods purchased in stores and supermarkets (empty, pieces), bags and packages based on toxic polyethylene film are used. After all, these toxic plastic bags are thrown into the garbage disposal and accumulate there, polluting the environment and air. Also in the steppe regions of the country there are wild plants that are rapidly renewable, such as reeds. The disposal of both toxic polyethylene waste and reeds contained in building materials is relevant for the economy of Kazakhstan. It is possible to solve the environmental and economic problems of the country by disposing of the waste of polyethylene plastic as a binder to obtain reed-layered building material. The project provides for the comprehensive recycling of toxic polyethylene waste as a binder for the production of building materials compressed along and across reed fibers. The final result of the project will be the following products: construction plywood, floor materials (chipboard), wall support and enclosing structures in the form of slabs and bars. The technical result of the project is to obtain an inexpensive environmentally friendly, durable building material and products made from it, which has high thermal insulation, strength and decorative properties.</p>
<b>Relevance</b>	<p>The project relates to the field of industrial ecology, solid waste recycling and technology for the production of building materials. With the increase in the welfare of the country's population, the purchasing power in various consumer goods, movable and immovable property, and also grocery goods increases accordingly. Bags and bags based on toxic polyethylene film are used to carry all purchased goods (loose, piece) in shops and supermarkets. After all, these toxic polyethylene bags are thrown into a garbage dump and continue to accumulate there, polluting the environment and the air.</p>
<b>Purpose</b>	<p>The purpose of this work is the utilization of waste polyethylene film as a binder for the production of reed-layered building material with high technical and economic indicators.</p>
<b>Expected results</b>	<p>1) In accordance with the set goal and objectives of the project, on the basis of recycled plastic film waste and vegetable cane waste, we will obtain an effective reed-layered building material with high technical and economic indicators for their use in the construction of industrial and civil buildings. In this regard, we will solve the ecological and economic problems of the country.</p> <p>2) The results of the project will be reflected in peer-reviewed scientific publications of the countries of the far and near abroad, including:</p> <ul style="list-style-type: none"> <li>- articles in peer-reviewed scientific publications indexed in the Science Citation Index Expanded and included in the 1st (first), 2nd (second) and (or) 3rd (third) quartile by impact factor in the Web of Science database and (or) having a CiteScore percentile in the Scopus database of at least 50 (sixty) - 2 units;</li> <li>- articles or reviews in a peer-reviewed foreign or domestic publication recommended by the Committee for Quality Assurance in the Field of Science and Higher Education of the Ministry of Science and</li> </ul>

	<p>Higher Education - 3 units;</p> <p>- conference reports on the thematic area in conference collections or foreign journals – 3 units.</p> <p>3). A training manual entitled "Thermal insulation building materials based on local raw materials" will be published.</p> <p>4) Based on the results of the study, an application for an innovative patent will be submitted to the Kazakhstan Patent Office on the topic of the topic under study.</p> <p>5) The obtained samples of wall structures for the walls of buildings based on drilling mud will be introduced into production.</p> <p>7) The novelty of the project is the production of an effective reed-layered building material with high technical and economic characteristics on the basis of recycled plastic film and plant waste of cane. The scientific results can serve as enclosing and decorative elements for industrial and civil buildings.</p> <p>8) The results of the project will be subject to commercialization, with sufficient funding. The results of the project will be useful to architects, builders and construction technologists of the Republic of Kazakhstan and abroad;)</p> <p>9) The target consumers of the results obtained will be technical research organizations, construction organizations and the private sector of the population, construction faculties of higher educational institutions of Kazakhstan, state institutions;</p> <p>10) According to the results of the study, breakthrough results can be achieved that affect the development of science and technology in the fields of environmental protection and building materials science. The existing risks will be promptly resolved by both scientists and the university administration.</p> <p>11) Dissemination of the research results among potential users and the general public is carried out through the media, participation in international conferences and publications in scientific journals.</p>
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<b>Research group</b>	<p>Supervisor – Main researcher: Abilkhair Issakulov, PhD, индекс Хирша h=4 (Author ID в Scopus – 58567470500; ORCID - 0000-0002-2462-6185).  <a href="https://www.scopus.com/authid/detail.uri?authorId=58567470500">https://www.scopus.com/authid/detail.uri?authorId=58567470500</a></p> <p>Scientific consultant: Baizak Issakulov индекс Хирша h=5 (Author ID в Scopus – 58179865000; ORCID - <a href="https://orcid.org/0000-0002-4597-2028">https://orcid.org/0000-0002-4597-2028</a>).  <a href="https://www.scopus.com/authid/detail.uri?authorId=58179865000">https://www.scopus.com/authid/detail.uri?authorId=58179865000</a></p>
<b>Publications in scientific publications</b>	<ol style="list-style-type: none"> <li>1. Isakulov, B., Issakulov, A., Dąbska, A. Structure Formation and Curing Stage of Arbolite–Concrete Composites Based on Iron-Sulfur Binders InfrastructuresOpen source preview, 2025, 10(7), 179 (<a href="https://www.scopus.com/pages/publications/105011737119">https://www.scopus.com/pages/publications/105011737119</a> )</li> <li>2. Isakulov, B., Abdullaev, H., Tukashev, Z., Issakulov, A., Sundetova, A. <u>INCREASING THE PERFORMANCE OF LIGHTWEIGHT CONCRETE BY IMPREGNATION WITH SULFUR WASTE</u> <u>Eureka Physics and Engineering</u>Open source preview, 2025, 2025(3), pp 183–191 (<a href="https://www.scopus.com/pages/publications/105007642514">https://www.scopus.com/pages/publications/105007642514</a> )</li> <li>3. Isakulov, B., Balmaganbetova, F., Sundetova, A., Issakulov A., &amp; Dakir, B. (2025). Increase of physical and mechanical parameters of arbolite-concrete composites by deep impregnation with liquid sulfur. <i>Bulletin of L.N. Gumilyov Eurasian National University Technical Science and Technology Series</i>, 151(2), 59–76.  <a href="https://doi.org/10.32523/2616-7263-2025-151-2-59-76">https://doi.org/10.32523/2616-7263-2025-151-2-59-76</a></li> </ol>