ABOUT COMPANY

S-Engineering is a Ukrainian engineering company that is part of the SE Group International holding. The company has been operating since 2007. S-Engineering develops and implements turn-key projects in such fields: power supply systems, automation systems, electric drive control, technical security systems, telecommunication systems.

SENUMAC technology allows to prevent the emergency shutdowns, connected with elevator boot overloading by granular material, and negative consequences of these shutdowns. It will allow carrying out of transportation processes with high, close to the maximum achievable efficiency in specific conditions of work lines.
ABOUT COMPANY

- The official partner of DF&PD Department of SC Siemens Ukraine.
- Status of the international partner in the Siemens Solution Partner Automation program.
- Patented technologies SENUMAC and LEFFOL.
- EPC-contractor in the construction of energy and industrial facilities.

Number of implemented projects

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>10</td>
</tr>
<tr>
<td>2008</td>
<td>50</td>
</tr>
<tr>
<td>2009</td>
<td>150</td>
</tr>
<tr>
<td>2010</td>
<td>200</td>
</tr>
<tr>
<td>2011</td>
<td>300</td>
</tr>
<tr>
<td>2012</td>
<td>250</td>
</tr>
<tr>
<td>2013</td>
<td>350</td>
</tr>
<tr>
<td>2014</td>
<td>400</td>
</tr>
<tr>
<td>2015</td>
<td>450</td>
</tr>
<tr>
<td>2016</td>
<td>500</td>
</tr>
<tr>
<td>2017</td>
<td>550</td>
</tr>
</tbody>
</table>
SETTING TASKS
In 2010, a comprehensive analysis of the prospects for the development of agricultural production in Ukraine and the growth of transshipment capacities was carried out. Forecast: export growth, significant increase of competition among transshipment complexes, reduction of transportation prices.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2010</th>
<th>2016</th>
<th>Difference, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain production, mln tons</td>
<td>39</td>
<td>66</td>
<td>70</td>
</tr>
<tr>
<td>Export of grain, mln tons</td>
<td>20</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Transshipment capacities, mln tons</td>
<td>25</td>
<td>54</td>
<td>115</td>
</tr>
<tr>
<td>Coverage of exports, times</td>
<td>1,25</td>
<td>1,35</td>
<td>8</td>
</tr>
<tr>
<td>Cost of transshipment, $/ton</td>
<td>20</td>
<td>15</td>
<td>-25</td>
</tr>
</tbody>
</table>
Develop innovative technology enabling:

- to increase efficiency of grain transshipment,
- to minimize the human factor,
- to minimize emergency shutdowns,
- to reduce energy costs.

ROI when implementing the technology – no more than 1.5-2 years.
HISTORY OF THE TECHNOLOGY
DEVELOPMENT OF V1.0

- **2009**: Task setting and team building
- **2010**: Development of technology, creation of a simulation stand for the implementation object
- **2011**: Obtaining patents for SENUMAC® technology
- **2012**: The first introduction of the technology on the linear granary (20 thousand tons)
- **2013**: The technology package version 1.0 for linear granaries was developed
DEVELOPMENT OF V2.0

2014

Development of technology for lines with a capacity of more than 1000 tons/hour

2015

The introduction of technology at a grain terminal with a capacity of 2.5 million tons/year

2016

Successful completion of industrial testing of Senumac® technology version 2.0 for grain terminals

2017

Introduction of SENUMAC® V2.0 technology at a grain terminal with a capacity of 3 million tons/year
HARDWARE AND SOFTWARE BASE OF SENUMAC® TECHNOLOGY
HARDWARE AND SOFTWARE BASE OF SENUMAC® TECHNOLOGY

- Compatible with hardware platform – Siemens Simatic S7-300, 400, 1200, 1500
- Compatible with software platform – PCS7 / Win CC, MathLab
- Based on methods of guaranteed control and mathematical modeling of the object
- Web technologies support
BASIC FUNCTIONS OF SENUMAC® TECHNOLOGY
BASIC FUNCTIONS OF SENUMAC® TECHNOLOGY

Traditional granary

- 65 - 85%
- Error 30 - 40%
- 5 - 20 minutes
- Unpredictable

Granary with SENUMAC®

- 90 - 95%
- Error 5 - 10%
- 4 times
- Guaranteed

Capacity control
Dosage regimen
High speed response
Sustainability
OUTCOME OF SENUMAC® TECHNOLOGY
INTRODUCTION
INTRODUCTION AT THE LINEAR GRANARY

Experience in the introduction of SENUMAC® technology at the granary with a capacity 20 thousand tons.

- The introduction of technology on the line of unloading grain from silage;
- Increase of capacity by 17%;
- Reducing the cost per unit of electricity by 14%;
- No piling up of bucket conveyer on the unloading line;

Operational lifetime of the technology is more than 4 years, The volume of shipped grain, more than 100 thousand tons, ROI – 15 months
INTRODUCTION AT THE PORT TERMINAL

Experience in the introduction of Senumac® technology at the port terminal with a capacity of 2.5 million tons/year

- Introduction of technology on the ship loading line;
- Increase in capacity (decrease in loading time) by 10.2%;
- Reducing the cost per unit of electricity by 11%;
- Automatic dosage regimen (up to 10 sources);
- No piling up of bucket conveyer;

Operational lifetime of the technology is more than 7 months
The volume of shipped grain, more than 1 million tons,
ROI – less than 1 year
SENUMAC® TECHNOLOGY
DEVELOPMENT PLANS

• Completion of the introduction of SENUMAC® technology at grain terminals with a capacity of 3 and 5 million tons/year;
• Development of a version of technology for complexes for transshipment of other bulk cargo;
• Bringing efficiency up to 20%;
• Development of V3.0. – workout of the cargo-plan on the optimal territory;
• Entering international markets and creating a partner program.
## ANALYSIS OF AND FORECAST FOR AIC

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2016</th>
<th>2022</th>
<th>Difference, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain production, mln tons</td>
<td>66</td>
<td>90</td>
<td>37</td>
</tr>
<tr>
<td>Export of grain, mln tons</td>
<td>40</td>
<td>63</td>
<td>57</td>
</tr>
<tr>
<td>Transshipment capacities, mln tons</td>
<td>54</td>
<td>95</td>
<td>75</td>
</tr>
<tr>
<td>Coverage of exports, times</td>
<td>1,35</td>
<td>1,5</td>
<td>11</td>
</tr>
<tr>
<td>Cost of transshipment, $/ton</td>
<td>15</td>
<td>8</td>
<td>-47</td>
</tr>
</tbody>
</table>
CONTACTS

Ukraine, 65031, Odesa
28 Mykoly Borovskogo Street, building 47

Phone: +38 048 730 5731;
       +38 048 730 5733;
Fax:   +38 048 730 5740.

www.se.ua