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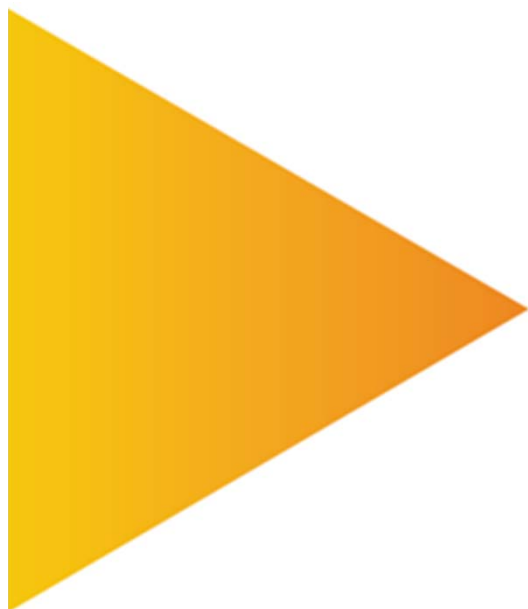
FUTURE 4.0 Final Public Event
GoToWebinar - December 17, 2020



Local Pilot Action: 3D Modelling and Advanced Manufacturing Solutions for Maritime Sector in Albania



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Local Pilot Action: Best Practice for Albania - Structure

□ The Local pilot Action for Albanian side was organised in three main levels:

❖ **AWARENESS**

- Current development trends in industrial production
- Components and benefits of Industry 4.0 in general and maritime sector

❖ **ACQUISITION**

- Digitalisation and 3D modelling as key factors for the integration of design and production processes in shipbuilding and boat building
- Best practices for the application of Industry 4.0 in maritime sector (Shipyard 4.0; Shipping 4.0) and the concept of ship digital twin

❖ **TRANSFORMATION**

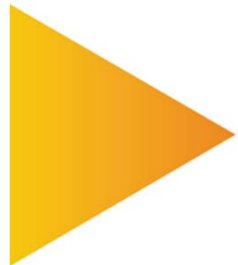
- To help local SMS on how they can apply innovation on products processes through the uses of 3D modelling and CNC machines :
 - ✓ Using 3D modelling and CNC machines for the production of a small ship wooden scale model.

Local Pilot Action: Best Practice for Albania _ Key Words



□ Key Words used for the Local Pilot Action as a whole, were:

- Industry 4.0
- 3D Modelling
- Reverse engineering techniques
- Ship Yard 4.0
- Shipping 4.0
- Digitalization in maritime sector
- CAD/CAM shipbuilding



Local Pilot Action: Best Practice for Albania - Motivation



❑ Motivation for the Local Pilot Action issues

- ❑ Interviews from the local stakeholders pointed out that there is a need for them to understand 3D modeling techniques
- ❑ Actual developments in Albania where there is an increasing tendency to build new small boat or ships (mainly recreation boat, fishing boat, small passenger boats) or to retrofit existing ships or boats.
- ❑ Other study from other INTERREG projects, *such as Shippment project «StrengtHening Intellectual Property and technology transfer processes in greEn sea mobiliTy secTors»*, have pointed out that focusing on new technologies, development of ICT for safety and logistic in maritime sector will be some of the MEGATRENDS for future development in ADRION Area
 - Focusing on new technologies means:
 - ✓ **use of advanced design and production technologies**
 - ✓ development of advanced materials with higher productivity
 - ✓ Automation of production processes

**Main issues
of our LPA**



Local Pilot Action – Case

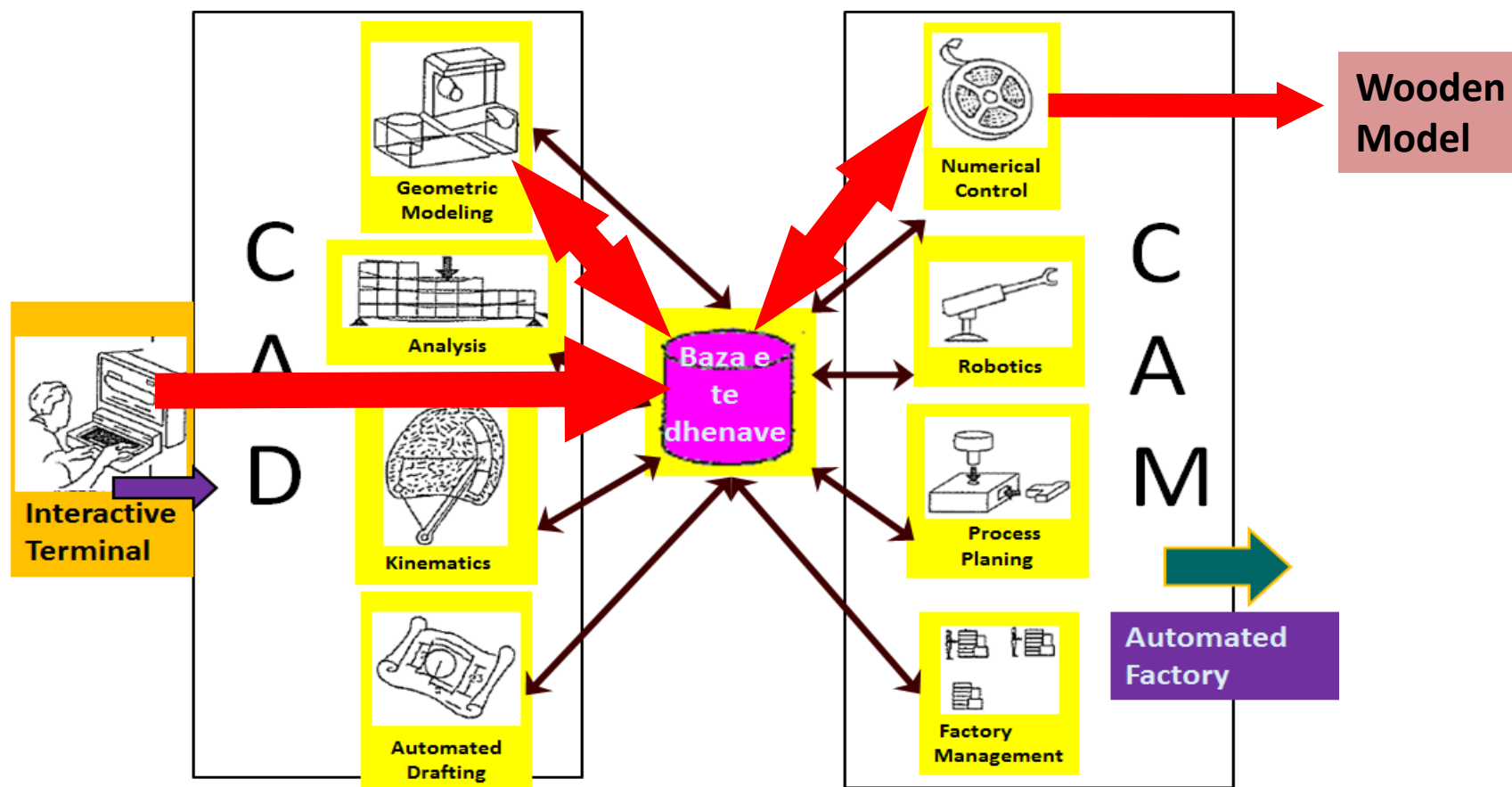


- ❑ **Case study.** Application of 3D modelling and Numerical Control Machines for the production of a small wooden model in an Albanian Local SME
- ✓ **Main Aims of the study case.** Implementation of a methodology for the production of wooden ship models on scale through modern methods of industrial production and based on the company resources.
- ✓ **Tools Available.** CAD software for 3D Modelling, CAM Software, Numerical Control Machines (CNC)
- ✓ **Implementation of the case study.** Local Albanian enterprise specialized in different wooden work processes, which is interested to be in market for the production of recreational boats, based on future development of Maritime Tourism in Vlora Bay



Local Pilot Action

Main Flow Chart



Main organisation structure of a CAD/CAM System used
 in an automated factory
 (adapted from Ship Production, 1995)

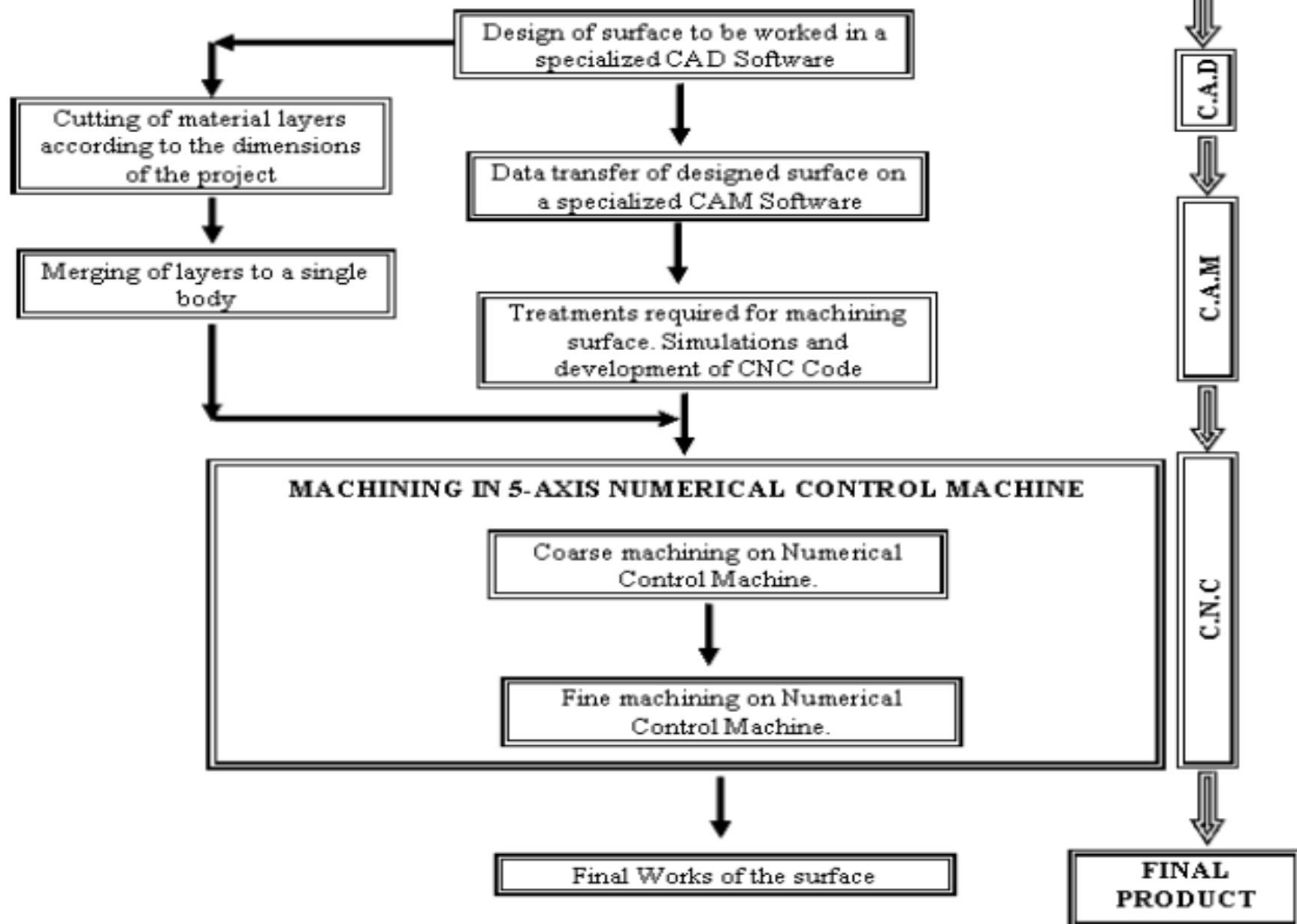
Local Pilot Action – Case 1



❑ The procedure of flow information, used for the production of the model, has been as following :

- ✓ 3D Modelling of the hull surface in a CAD software.
- ✓ Convert the data information of the 3D Surface in a neutral file (DXF,IGES or STEP)
- ✓ Import the neutral file in CAM software.
- ✓ Planning of manufacturing processes in CAM software
- ✓ Simulate and verify the manufacturing processes and make necessary corrections, in the CAM software
- ✓ Compilation of codes for the numerical control machine the (CNC Codes for each process)
- ✓ Run the codes on the numerical control machine (CNC)

These procedure is organised in a flow chart of flowing of information
(sea next slide)





Local Pilot Action Case Study

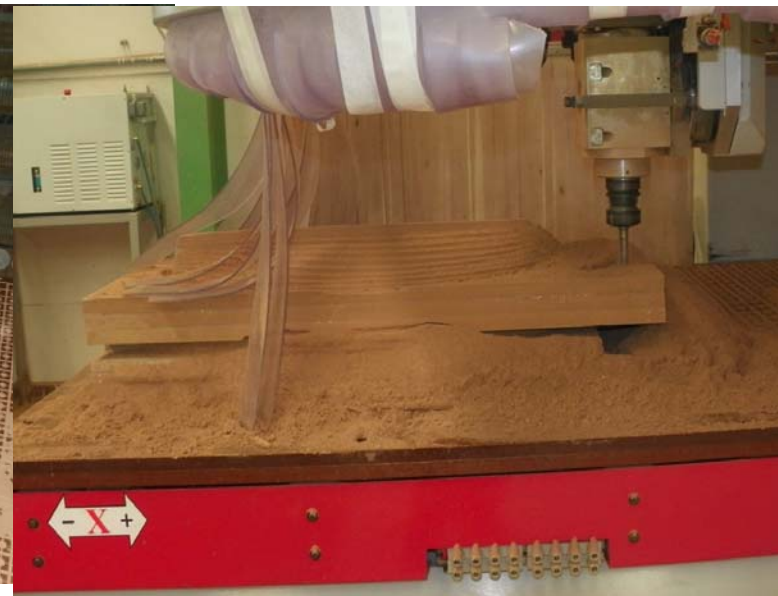
- The company provided us some data of the boat, in the form of the table of half breadth and main dimensions

		BRINJA																				
SIMBOLI	Peshkimi	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
wl 1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	81	81	81	81	---	---	---
wl 2	250	---	---	---	81	81	81	81	81	81	81	81	81	120.7	138.8	136.5	121.7	102.9	88.9	---	---	---
wl 3	500	---	---	80.8	169.3	327.1	489.8	631.7	735.7	800.6	825	810	758.4	674.9	566.8	443.3	319.4	210.4	131.9	85.6	---	---
wl 4	750	---	80.8	337.9	690.7	965.3	1187.5	1361.5	1489.3	1572.3	1610.6	1603.8	1549.9	1446.8	1293	1089.8	842.3	548.1	277.5	110.7	---	---
wl 5	1000	---	175.4	734	1119.2	1419	1647.6	1811.5	1921.7	1988.9	2021.4	2024.5	2001.9	1955.4	1883	1777	1627.9	1418.6	1107.6	584.6	---	---
wl 6	1250	80.8	474	1004.1	1378.5	1649.4	1838.2	1967.8	2052.9	2103	2125.1	2124.2	2104	2067.3	2015.7	1950.1	1870.6	1776	1661.2	1505.6	---	---
wl 7	1500	80.8	688.5	1172.2	1503.2	1740.6	1909.1	2025.2	2100.6	2140	2140	2140	2136	2099.8	2050.7	1990	1918.7	1837.3	1745.7	1642.7	1522	---
wl 8	1750	168.2	841.4	1271.4	1577.8	1797.8	1952.7	2058.3	2125.6	2140	2140	1903	1828	1864.4	2005.3	1996.6	1926.2	1846.1	1756.8	1657.9	1548.8	1425.7
wl 9	2000	375.1	953.4	1350.7	1636.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
wl 10	2250	530.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
WL Konst	1169.4	---	388.4	929.2	1312.2	1594.8	1799.4	1937.7	2027.6	2080.7	2104.6	2104.5	2084.3	2046.4	1992.3	1922.3	1835.5	1727.7	1583.9	1325.1	---	---
ABSHISA E BRINJES	5200	4680	4160	3640	3120	2600	2080	1560	1040	520	0	-520	-1040	-1560	-2080	-2600	-3120	-3640	-4160	-4680	-5200	

- Taking in consideration the main dimentions of the boat and the capacity of the numerical control machine that the company the model was produced with the following dimensions

Maximum Length – $L_{MAX} = 990$ mm
 Maximum Breadth at Midel = 347
 Maximum Depth at Midel = 131 mm
 Maximum Depth at Bow = 180 mm
 Maximum Depth at Stern = 174 mm

Local Pilot Action Case Study







Local Pilot Action Case Study

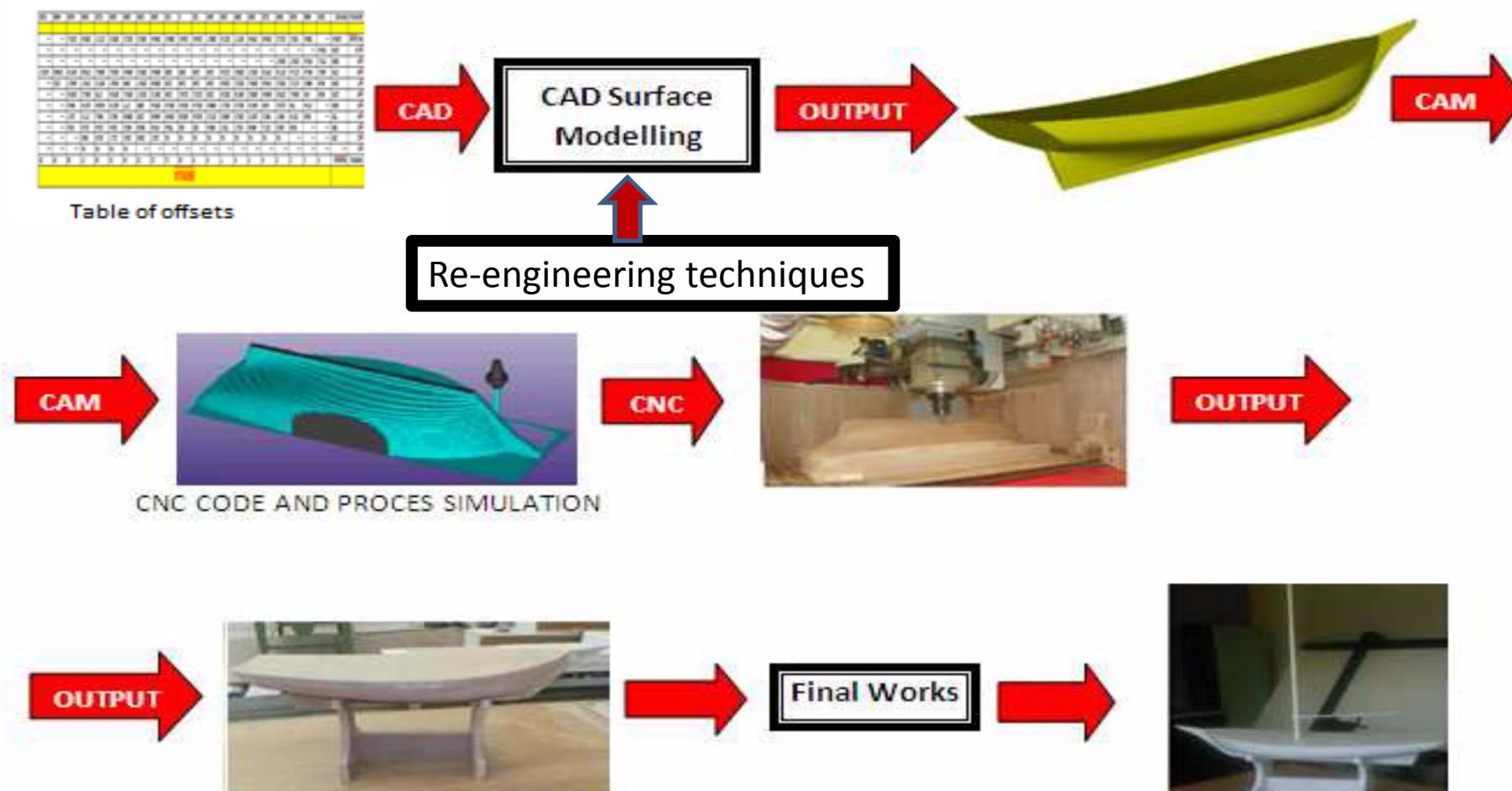


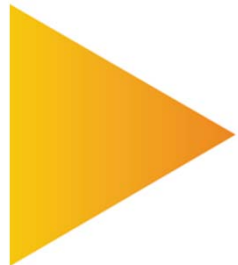
Illustration of main steps for the production of wooden model
 Table of offset- 3D Modelling – CAM Processing – CNC –Final Product

Local Pilot Action

Case Study Conclusive Remarks



- Although this procedure was applied to the production of a small scale wooden boat model, it can be also used with some small modifications for the manufacturing of constructive elements of wooden boats or moulds for fibreglass lamination using 3D modelling techniques and advanced manufacturing solutions.
- 3D modelling, reverse engineering techniques and Computer Aided Engineering analysis can also be used to create the virtual 3D Model of existing Ablanian ships, in order to assist ship owners, or operators, to prepare the necessary informations:
 - ✓ for the Albanian Register of Shipping for the retrofitting of their boat (trim stability booklet)
 - ✓ Reevaluate the hydrodynamics characteristics in case of ship/boat retrofitting





Thank You for Your Attention

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