

CASTAL

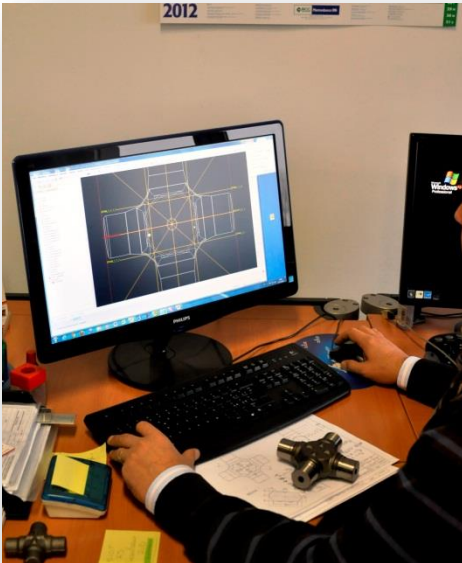
Hot forging of steel components

July 20, 2014

CASTAL PLANT

CASTAL

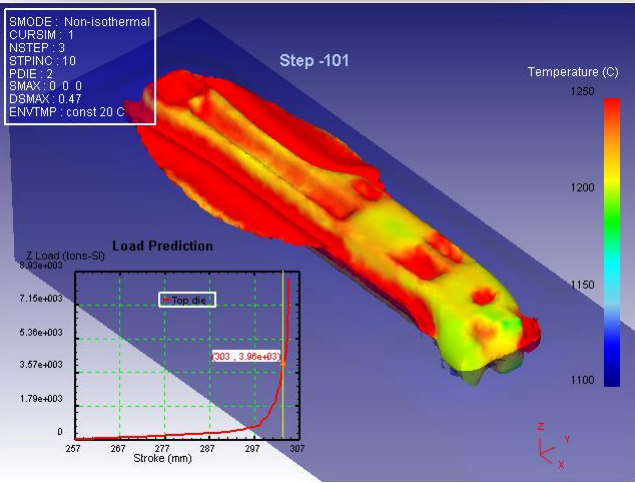
Stampaggio acciai a caldo



Established in 1971

CASTAL means competence for hot steel forging for more than 40 years.

Tradition, experience and technological innovation qualify CASTAL as leader in the production of engine parts such as pistons, camshafts, etc., as well as automotive, industrial and agricultural components.



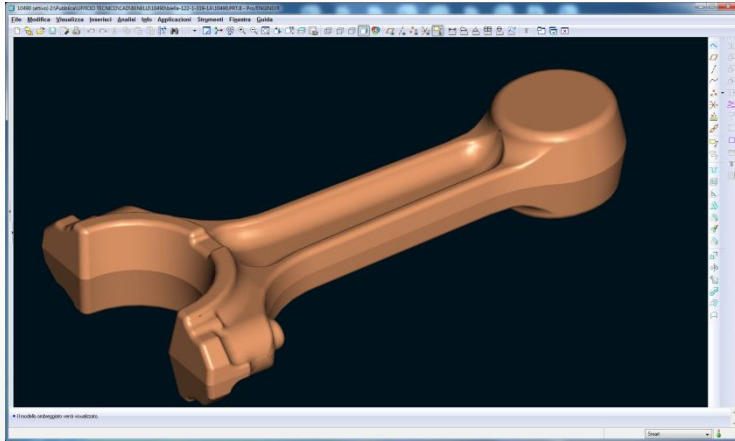
The company is certified according to the ISO 9001:2008



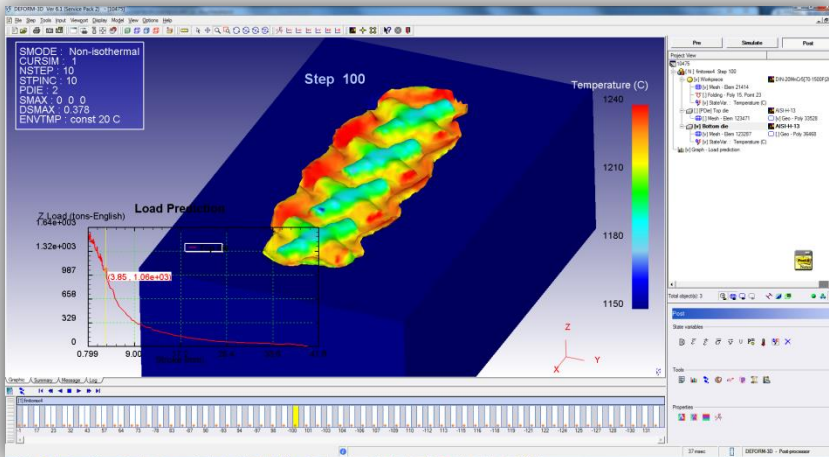
CASTAL PLANT SNAPSHOTS

CASTAL
Stampaggio acciai a caldo

**Integrated
CAD/CAE/CAM**



**Product and Process
design**



**CAE: process
simulation**

DESIGN AND EQUIPMENT

Forging and tools design:

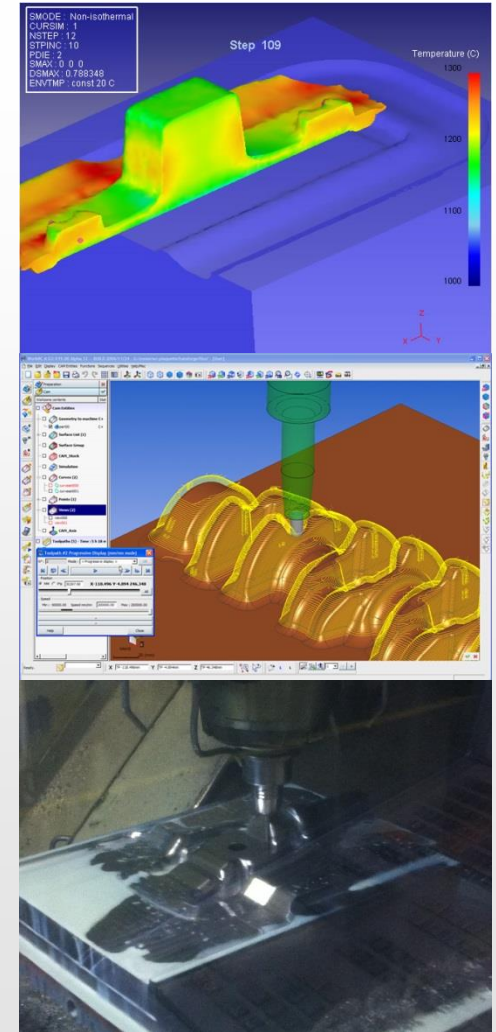
- Three-dimensional CAD Pro E
- CAM WorkNC

CAE - Design and optimization of the forging process and forge SW prototyping:

- DEFORM

Equipment construction:

- Electrical discharge machining
- High-speed numeric control milling machines
- Numeric control milling machines



CASTAL PLANT SNAPSHOTS

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Stampaggio acciai a caldo

Complete In-House tool machining



HSC machine
FAMUP and
Deckel,
S=15000rpm,
800mmx600mm
working area.



EDM immersion
AGIE

CASTAL PLANT SNAPSHOTS

Storage solutions and logistic concept of raw material according to customer's demand and specifications.



CASTAL PLANT SNAPSHOTS

Incoming material inspection by spectrometer test.



Portable spectrometer
SPECTRO TEST

Programma: Fe-10MO
 Commento: Low alloy steel; Spark
 Singola scarica

Elements: Concentration

Sample ID: CR0150157
 Grade comm:

Grade:

&No	C	Si	Mn	P	S	Cr	Mo	Ni	Al
	%	%	%	%	%	%	%	%	%
1	0.52	0.217	0.80	<0.003	0.014	0.212	0.011	0.061	0.015
2	0.50	0.215	0.80	<0.003	0.013	0.210	0.010	0.060	0.016
3	0.51	0.213	0.79	<0.003	0.013	0.209	0.009	0.060	0.015
4	0.52	0.212	0.79	<0.003	0.013	0.207	0.009	0.060	0.015

&No	Co	Cu	Nb	Ti	V	W	Pb	Sn	As
	%	%	%	%	%	%	%	%	%
1	<0.009	0.209	<0.005	0.080	0.002	<0.040	<0.010	0.016	0.007
2	<0.009	0.208	<0.005	0.080	<0.002	<0.040	<0.010	0.014	0.007
3	<0.009	0.206	<0.005	0.075	<0.002	<0.040	<0.010	0.015	0.007
4	<0.009	0.206	<0.005	0.076	0.002	<0.040	<0.010	0.016	0.009

&No	Zr	B	Fe
	%	%	%
1	<0.003	0.0018	97.8
2	<0.003	0.0015	97.9
3	<0.003	0.0016	97.9
4	<0.003	0.0018	97.9

Programma: Fe-10MO
 Commento: Low alloy steel; Spark
 Media (n=4)

Elements: Concentration

Sample ID: CR0150157
 Grade comm:

Grade:

	C	Si	Mn	P	S	Cr	Mo	Ni	Al
	%	%	%	%	%	%	%	%	%
-	0.52	0.215	0.80	<0.003	0.013	0.210	0.010	0.060	0.015
x									

	Co	Cu	Nb	Ti	V	W	Pb	Sn	As
	%	%	%	%	%	%	%	%	%
-	<0.009	0.207	<0.005	0.078	<0.002	<0.040	<0.010	0.015	0.008
x									

	Zr	B	Fe
	%	%	%
-	<0.003	0.0017	97.9
x			

Example of report analysis.

CASTAL PLANT SNAPSHOTS

The beginning of the process, cutting bars machine.



Traditional cutting machine (360mmx360mm max section)



Cold shearing machine (120mmx120mm max section)



HS cutting machine (Ø90mm max)



Pre-forming production machines

Rolling preforming machine Ø90mm max



Air hammer preforming machines Ø100mm max

CASTAL PLANT SNAPSHOTS

1600t FORGING LINE

2500t FORGING LINE

63kJ FORGING LINE



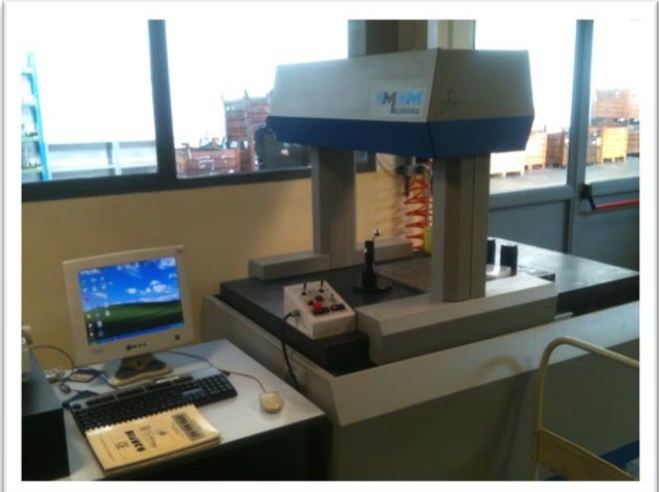
Induction furnace: 600kw → 1500kg/h
Mechanical Press: 1600 tonnes
N.2 hot trimming/punching machines

Induction furnace: 1000kw → 2500kg/h
Mechanical Press: 2500 tonnes
N.2 hot trimming/punching machines

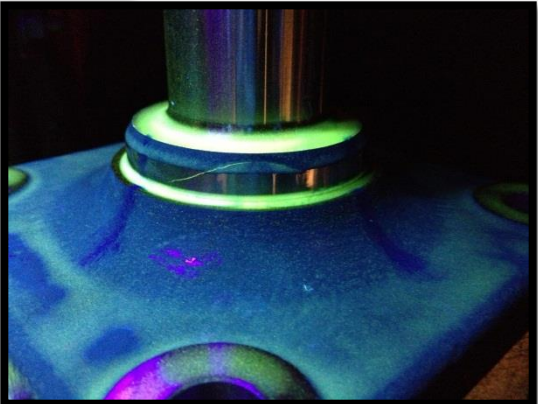
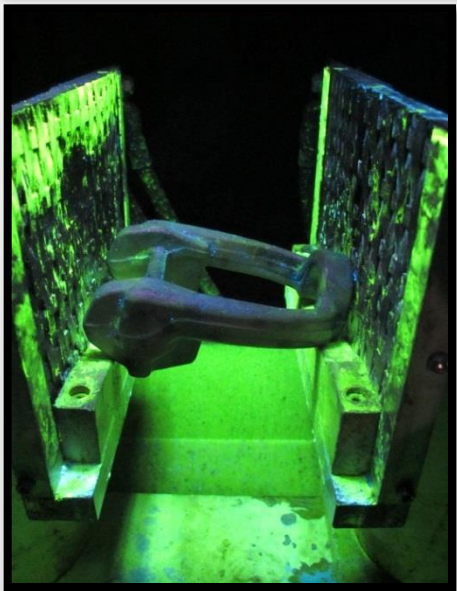
Induction furnace: 800kw → 2000kg/h
Air Hammer: 2000 tonnes
N.2 hot trimming/punching machines

CASTAL PRODUCTION AND FINAL CHECK

Competitive production and high standard in manufacturing by using 100% magnaflux check, 3D dimensional checkcheck and Brinell hardness test – Fiber flow analysis.



3D measurement system MDM
Range 700X500X400 mm



Machine Brinell hardness test

CASTAL PRODUCTION AND FINAL CHECK

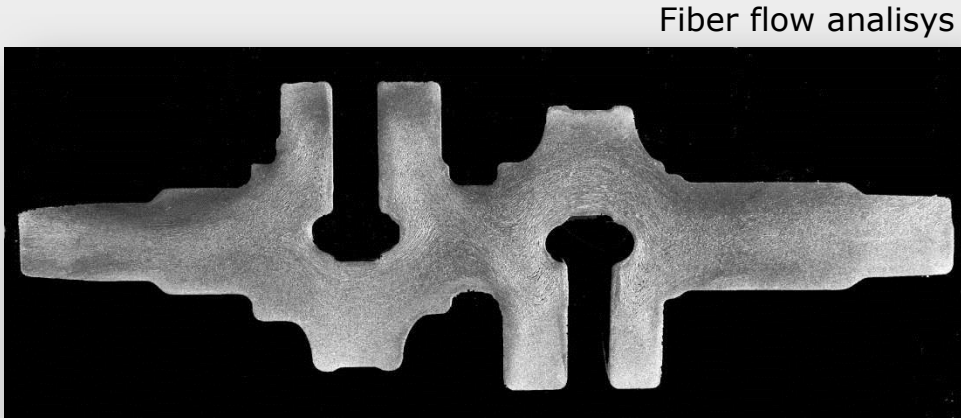


TEMA FLUX
Magnetoscopic check

Competitive production and high standard in manufacturing by using 100% magnaflux check, 3D dimensional check and fiber flow analysis

		RELAZIONE ANDAMENTO FIBRE GRAIN FLOW INSPECTION		Mod. RAF 20/05/13
CARATTERISTICHE - CHARACTERISTICS				
Cliente Customer	BENELLI Q.J.	PARTICOLARE PART NAME DISEGNO PRINT No.	CRANKSHAFT 121.1.318.1A rev. 02	
SEZIONE ANALIZZATA - SECTION INSPECTED				
Tipo di controllo Type of inspection		Aliscoo ASTM E340 Macroetch ASTM E340		
Sezione analizzata Section inspected		Porzioni di sezione longitudinale pazzante per l'asse principale ed il perno di biella di ogni cilindro.		
RISULTATI - RESULTS				
Dall'esame effettuato si denota un andamento naturale delle fibre. Non si rilevano cricche o ripiegature di materiale.				
Controllato da - Inspector				
A. Agosti				

Fiber flow analysis - Report



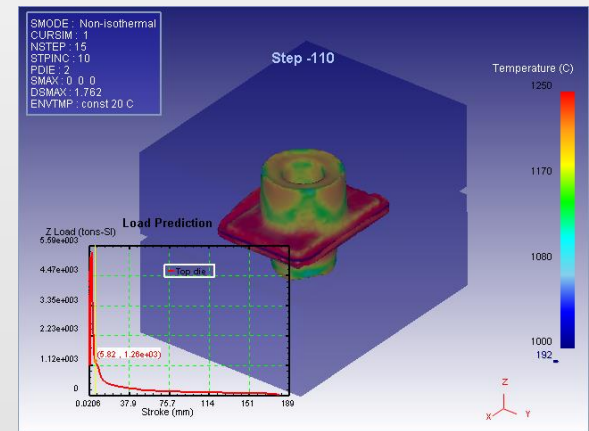
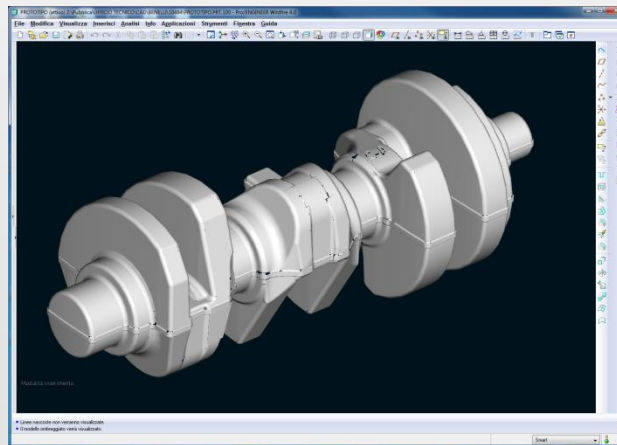
Fiber flow analysis

CASTAL TECHNOLOGY

The modern industrial development requires an ever-increasing attention in the engineering stage, raising the importance of a good co-operation with the supplier, already from the beginning of the project.

CASTAL offers to its customer co-design competence, looking for cost targets and high degrees of industrialization. Today, the technical staff operates on modern modelling tools and systems, like Pro-Engineer (Parametric Technology) and also Deforme, specific systems for the sampling and the optimization of hot forging process.

The company develops and produces all its dies and tools inside: this is its fundamental know-how. Through its process, it guarantees a constant and correct metal fiber position, obtaining a product with high quality features.



CASTAL'S PRODUCTS

CASTAL works in the steel hot pressing market for products made according to customer specification.

The flexibility of the hot pressing production process used allows the company to work in a range of markets.

The main reference markets are:

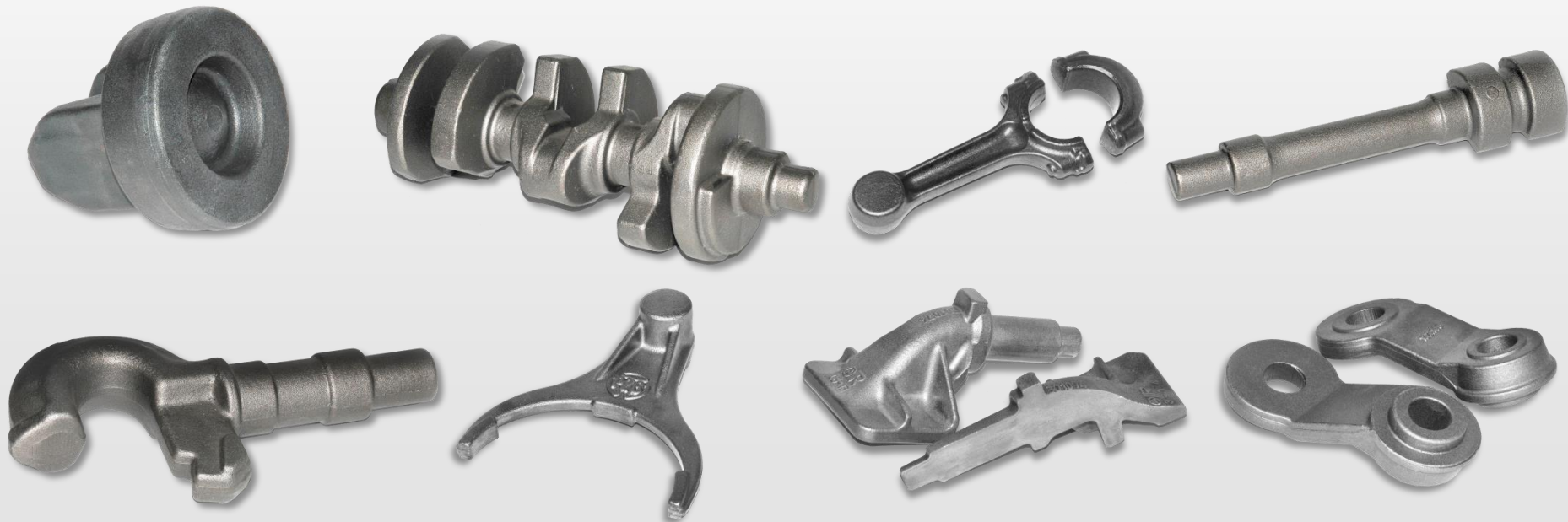
Motors: crankshafts, connecting rod, drive shafts, fork, pistons.

Agriculture: transmission parts including universal joints, homokinetic couplings, tools.

Mechanical: transmission parts including toothed wheels, self- keying couplings, pulleys, clutch disk supports, pinions.

Building: joints for flanged pipes for cement transportation, various components.

Motorbike sector: fork, supports, connecting rod, crankshafts.



HOW TO REACH US

○ HIGHWAY A21
EXIT MANERBIO

Follow Via S. Martino del Carso and
Via Ermengarda until Leno

3,4 km/4 min

↑ 1. Follow direction south-west

65 m

📍 2. At roundabout take the fourth exit
to Via S.Martino del Carso

2,2 km

↑ 3. Continue on Via Ermengarda

1,2 km

📍 4. At roundabout take the second exit

1,4 km/1 min

Drive on Via Tito Speri

3,2 km/4 min

📍 5. At roundabout take the second exit on
SP668

1,9 km

➡ 6. Take the exit to Leno

220 m

🚶 7. Drive on Via Tito Speri

200 m

📍 8. At roundabout take the third exit still on
Via Tito Speri

700 m

📍 9. At roundabout take the third exit

110 m

Drive until the final destination

1,6 km/3 min

↩ 10. Keep the left line

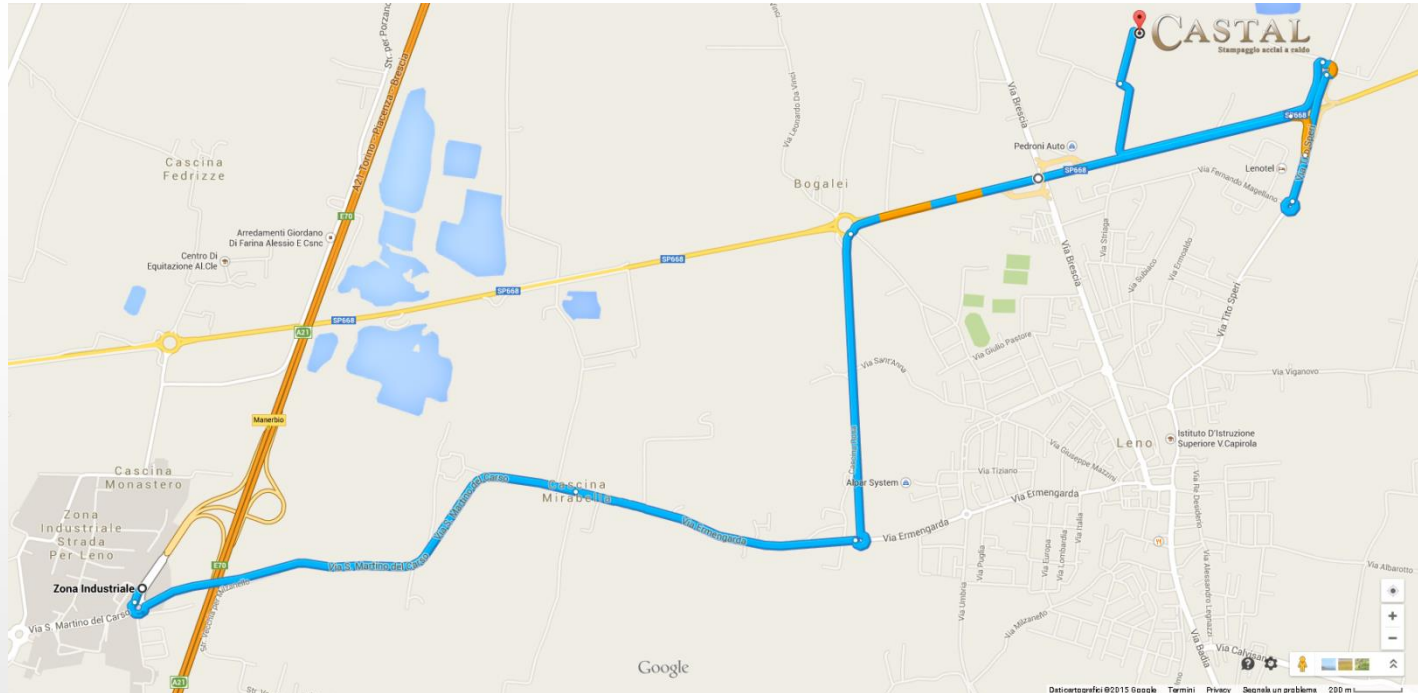
1,3 km

➡ 11. Turn right

📍 Your final destination is on the road.

230 m

○ CASTAL Strada Striaga 4



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