

## CONSTRUCTION WORK REPORT

# Pellizzari s.r.l.



## RESTORATION OF BUILDINGS AND CAPITAL ITEMS FOLLOWING THE EARTHQUAKES OF 20 AND 29 MAY 2012

**Client:** ZINCOL ITALIA S.p.A.

Via G. Matteotti, 24 – 36021 Barbarano Vicentino (VI)

**Site Address:** Via del Commercio, 440 – 41038 San Felice sul Panaro (MO)

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## 1. COMPANY INFORMATION AND PRE-EARTHQUAKE ACTIVITY

Company: **Zincol Italia S.p.A. – Barbarano Vicentino (VI)**

Registered Office and local site affected by the earthquake: **Zincol Italia S.p.A. – San Felice sul Panaro (MO)**

Industrial complex at Via del Commercio, 440

The ZINCOL ITALIA S.P.A plant at Via del Commercio n. 440, San Felice sul Panaro (MO), employs metallurgical and chemical processes to perform hot dip galvanising and industrial coating of manufactured metal products.

The Company, which began life as Zincopol in 1967, performing hot dip galvanising, was acquired by Gruppo Zincol Italia S.P.A in December 2004. The Zincol Italia production site at San Felice now belongs to this group, which is based in Barbarano Vicentino.



## 2. AREAS OF OPERATION

- yard areas of 74,000 sq m approx. (materials storage and handling zones, storm water basin and waste treatment plant, reactive chemicals storage).
- usable area at the time of the earthquake **16,655 sq m**
- usable area after restoration work: **17,126 sq m**

## 3. ACTIVITY FOLLOWING THE EARTHQUAKES OF 20/29 MAY 2012

Shortly after the earthquake of 20/05/2012, a presentation was made to the San Felice municipal authorities regarding the condition of buildings in the industrial complex, classified according to whether they were fit for use or in need of work to make them safe.

After subsequent earthquakes, particularly those of 29/05/2012, the condition of the buildings had changed; survey and safety work was put on hold following the Municipal Order for the suspension of activity at industrial sites.

Articles 3 c.7 and 19 of Legislative Decree 06/06/2012 GU. N°131 of 07/06/2012 established “*Criteria for the Restoration of Conformity of Industrial Buildings*”, and work began subsequently to establish the state of the buildings and make them safe.

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## PRELIMINARY WORK

Initial work on the buildings involved demolition of dangerous sections and structural renovation of the coating building, where production activity was able to resume in July 2012, while administrative and technical services were relocated to temporary offices set up in the yard.

Initial work on plants and equipment was directed at making them safe and establishing the extent of damage (emptying of the acid baths, galvanising bath and reagent tanks, isolation of plants and restoration of storm water purification facilities).

## SUBSEQUENT ACTIVITY

The new design envisaged a completely new layout, to provide a safer and healthier working environment, and a more efficient production process from the technological, environmental and management points of view.

The project provided for the grouping and optimisation of buildings, with linked production areas to reduce material movements.

The purpose of the Buildings Restoration Project presentation was to secure building permission from the San Felice S. Panaro authorities. It was segmented as follows, according to the nature of the work involved:

- Buildings to be retained as they stood, their damage not indicating a need for seismic upgrading
- Buildings that were structurally adapted and able to remain in their original positions
- Buildings to be demolished and rebuilt in the same locations to meet the new production facilities
- Buildings with significant damage, to be demolished and rebuilt elsewhere

## REPAIR / REPURCHASE OF CAPITAL ITEMS

Plans for the repair and repurchase of capital items were divided into two main categories:

1. The purchase of new technology from GIMECO S.r.l., in the form of replacement machinery and process equipment.
2. Repairs to the network supplying the storm water treatment plant.

## 4. EXECUTION TIME

Work began on 25 July 2014 and was completed in December 2015.

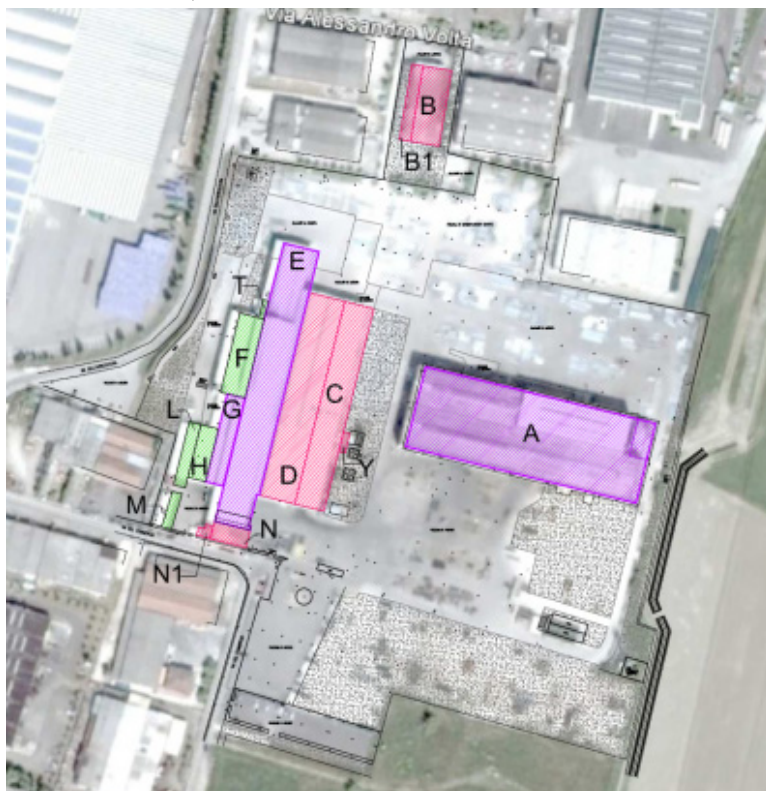
## 5. TOTAL COST OF THE RESTORATION WORK

The total cost of the work amounted to **€24,000,000**, allocated as follows:

- CONSTRUCTION – by **Pellizzari S.r.l.** **€11,300,000**
- CAPITAL GOODS – by **Gimeco Impianti S.r.l.** **€12,700,000**

## 6. SITE LAYOUT

### POST-EARTHQUAKE LAYOUT



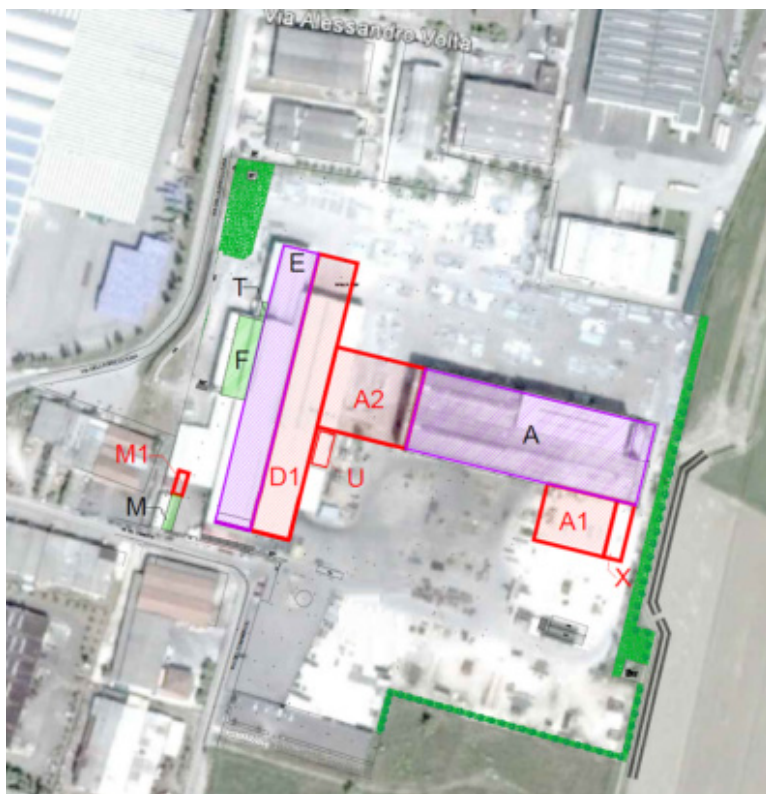
CLASSIFICATION OF BUILDINGS AND ROOF STRUCTURES		
STRUCTURES WITH SERIOUS AND/OR VERY SERIOUS DAMAGE		
D	FINISHING AND STORAGE BUILDING	2340 sq m
C	FINISHING AND STRIPPING BUILDING	1910 sq m
B	THIRD PARTIES INDUSTRIAL SHED	680 sq m
B1	THIRD PARTIES INDUSTRIAL SHED CANOPY	265 sq m
Y	TECHNICAL ROOM	41 sq m
N1	TECHNICAL SERVICES OFFICES	47 sq m
N	OFFICE BLOCK	200+200 sq m
Subtotal		5683 sq m
STRUCTURES TO BE RENOVATED		
A	GALVANISING BUILDING	5965 sq m
E	COATING BUILDING	3200 sq m
G	WORKSHOP BUILDING	502 sq m
Subtotal		9667 sq m
EXISTING STRUCTURES		
M	CANTEEN BUILDING	113 sq m
L	MEDICAL BUILDING AND CHANGING ROOMS	240 sq m
H	CANOPY	302 sq m
F	COATING SERVICES BUILDING	325 sq m
T	TECHNICAL CENTRE	32 sq m
Subtotal		1315 sq m
TOT		16665 sq m

structures with SERIOUS and/or VERY SERIOUS damage

structures to be RENOVATED

EXISTING structures

### NEW LAYOUT



NEW STRUCTURES		
A1	GALVANISING BUILDING - south wing	1265 sq m
A2	GALVANISING BUILDING - west wing	2294 sq m
D1	FINISHING BUILDING	3020 sq m
X	CANOPY for tank protection	317 sq m
U	OFFICE BLOCK	200 sq m
M1	NEW CHANGING ROOMS	72 sq m
Subtotal (sq m)		7168
STRUCTURES TO BE RENOVATED		
A	GALVANISING BUILDING	5965 sq m
E	COATING BUILDING	3200 sq m
Subtotal (sq m)		9165
EXISTING STRUCTURES		
M	CANTEEN BUILDING	113 sq m
F	COATING SERVICES BUILDING	628 sq m
T	TECHNICAL CENTRE	32 sq m
Subtotal (sq m)		773
TOTAL sq m (new structures, renovations, existing)		17126

structures with SERIOUS and/or VERY SERIOUS damage

structures to be RENOVATED

EXISTING structures



## 7. DEMOLITION OF EXISTING BUILDINGS

***Industrial building with mono-pitch metal-panel trussed roof, prestressed reinforced concrete supporting structure, and masonry walls.***

Dimensions 115 m x 16.6 m (centre to centre distance), tie level height 9.10 m, apex height 10.50 m.

Unusable after the earthquake because of partial roof collapse and displacement of roof trusses from their seatings.

***Industrial building with mono-pitch metal construction roof, reinforced concrete supporting structure, and masonry walls.***

Dimensions 115 m x 20.5 m, tie level height 9.54 m, apex height 11.58 m.

Roof collapse rendered the building unusable, and a decision was taken to demolish.



## 8. REBUILDING

***Industrial building constructed mainly in prestressed reinforced concrete with sandwich panel roof.***

Overall dimensions 131 m x 45.6 m, tie level height 12 m approx, apex height 15.5 m.

The earthquake rendered the building unusable due to collapse and partial detachment of external wall panels and sections of the roof, with damage to two columns at the entrance portal frames.





**RECONSTRUCTION OR UPGRADING WORK**

1. Installation of external metal panels or creation of a roof parapet with safety line
2. Removal of roof covering and replacement with roof panels
3. Re-siting of internal equipment hindering operations
4. Additional operations to ensure the safety of structures and internal equipment
5. Demolition of internal structures hindering new building work
6. Demolition of acid bath in preparation for replacement
7. Demolition of obstructive sections of pre-heat and galvanising oven foundations in preparation for replacements
8. Installation on columns of connection brackets for existing trusses
9. Installation of cladding on stanchions





## 9. NEW CONSTRUCTIONS

### ***Metal construction industrial building on vibro-driven piles.***

Dimensions: width 39.5 m approx, length 32 m, tie level height 14.3 m.



***Metal construction industrial building on continuous foundations.***

Dimensions: total width 44.0 m (20 m + 24 m), tie level height 12 m.

***Metal construction industrial shed on continuous foundations.***

Dimensions: width 20 m approx, tie level height 9.8 m, apex height 11 m.





**Single raised floor non-industrial building with outer walls of lightweight concrete blocks dressed with expanded clay, and movable internal partitioning, either blank or windowed.**

Dimensions: 10.0 m x 20.0 m, internal height 3.25 m and flat roof height 3.75 m.

