SYSTEM FOR FIXING ARMOURS DURING CONCRETING

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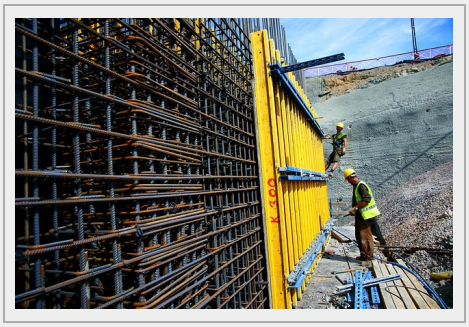
RESUM

The research group "Materials and Construction Systems for Buildings", from the Building and Urbanism Department of the University of Alicante, has developed a new and simple system that allows to fix any type of armours in concrete construction elements during the concreting process. This system avoids the movement of the armours in an efficient, technical and reusable way, and, therefore, also avoids future expensive treatments in case of unwanted movements. This new system is characterized by its low cost, light weight, ease of use and versatility for any constructive element.

The research group is looking for companies interested in commercial exploitation.



INTRODUCCIÓ

During the execution process of reinforced concrete construction elements, it is essential to fix the armours to avoid their movement during concreting. If this movement occurs, it will affect the coating itself, not being able to guarantee the necessary thickness for protection (the margin for errors during the execution process is minimal).This error can only be corrected a posteriori:

a) By bending the armours in the hardened concrete, which can weaken or damage the reinforcement.

b) By drilling and placing new armours with epoxy resins, which does not guarantee an equal adherence and resistance.

When the movement of the armour is excessive, the only solution is to demolish the constructive element and proceed to its completely reconstruction.

Nowadays, to prevent movement of the armours during concreting:

i. We proceed to simply tie the reinforcements to the beams or bands of constructive elements.

ii. We use some auxiliary elements fastened to the base support (ground, formwork, etc.).

iii. No specific measures are taken.

In general, the solutions carried out nowadays show the following disadvantages:

1) They do not meet the minimum coating required by the regulations.

2) They require a high installation time.

3) They are not reusable items.

In short, during the execution process of reinforced concrete construction elements, either no measure is used to fix the armours or a very simple process is used (not solving the problem in an efficient, technical and reusable way). This situation carries numerous drawbacks and can lead to significant problems.

DESCRIPCIÓ TÈCNICA

The present invention solves the technical problems described above, so we have developed a system to allow fixing the armours in reinforced concrete elements during the concreting process, avoiding the movement of the armours.

The system (Figures 1 and 2) is formed by at least two pieces: a main one and, at least, a secondary one. Both have simple geometry and little weight, being able to have variable length, width, thickness and form to adjust to the constructive needs in each case.

The pieces are joined by a deployment device that allows them to freely move and rotate in different directions. This device comprises a longitudinal orifice and a turning element (screw, pin, bolt, etc.), which allows the movement in one of the two pieces, or allows the longitudinal displacement of the secondary element on the main piece.

These parts have a fixing element that allows the system to be fastened to the armours and also to the base support (e.g., ground, forged, etc.), forming, as a whole, a non-deformable triangle.

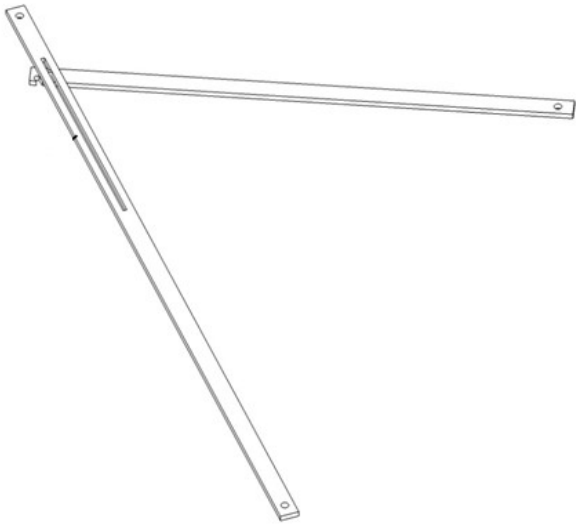


Figure 1: system for fixing armours (main piece and secondary piece)



Figure 2: system for fixing armours (main piece and secondary piece)

AVANTATGES I ASPECTES INNOVADORS

MAIN ADVANTAGES OF THE TECHNOLOGY

The advantages of this element over currently existing devices on the market are:

1) Avoids the movement of the armours.

2) Ensures the coating of the bars.

3) Eliminates possible deviations.

4) Avoids costly solutions a posteriori to correct wrong movements.

5) Fixing is done quickly and safely.

6) The necessary labour is reduced.

7) Ease of use.

8) The size and weight of the system are small.

9) The system is managed by a single worker.

10) Space and security problems are avoided.

11) The acquisition cost of the system is low.

12) The pieces have a simple geometry.

13) Ease to manufacture the pieces.

14) It is possible to reuse it, which reduces the total cost of the product.

15) It is very versatile, since it can be manufactured with different dimensions and formats.

16) It can be used in any type of work and for armours in different sizes.

17) It is extensible: it adjusts to any dimension of the constructive element (even in those of considerable lengths).

18) Ease of production: due to its reduced dimensions and simple geometry, it can be manufactured by companies from different sectors: metal, wood, plastic, etc.

19) Simple transport: being foldable and easily stackable.

20) Can be removed without causing damage or damage to the armours.

21) High speed and ease of implementation.

22) No complementary machinery is necessary for its placement.

INNOVATIVE ASPECTS

Nowadays, there are no patented systems on the market to solve the armours fixation in reinforced concrete construction elements in an efficiently, accurately and reusable way, since it is usually done manually.

The present invention prevents the movement of the armours during the concreting process, avoiding to make expensive corrections afterwards.

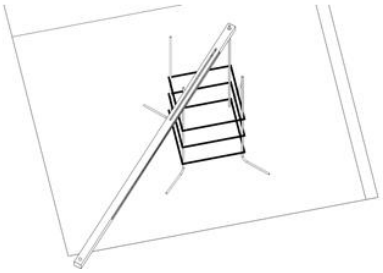
ESTAT ACTUAL

To demonstrate that the system meets all the requirements needed, we made a test about the fixation of armours in a pillar (with centred foundation).

The steps followed for the test procedure were:

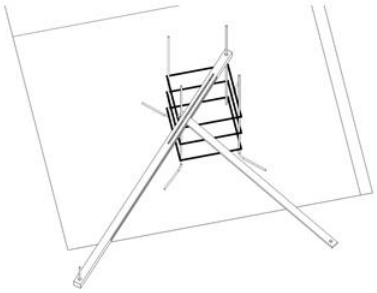
1. *Preparation of the base element:* place the armours of the pillar.

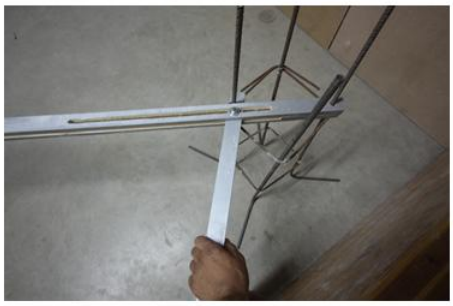
2. *Positioning the system in a folded position on the base element:* insert the hole of the main piece into the armour to be fastened, and the hole of the secondary piece in other armour.



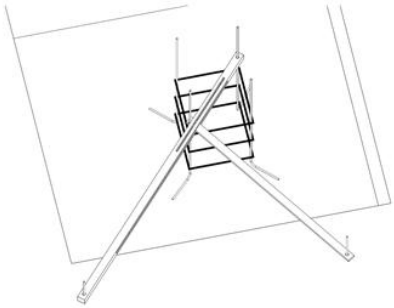


3. *Deployment of the system:* the system is deployed through the longitudinal displacement of the secondary piece, adjusting to the existing dimension between the armours to be fastened. The secondary part is rotated, fixing the distance between the selected armours. Once fixed, the system is fastened to the base support by means of two nailed stucks, forming an non-deformable triangle that fixes the armours to resist the concreting process.





4. *Fastening the system to the base support:* the ends of the system are fixed to the base support.





APLICACIONS DE L'OFERTA

- Construction and Building Products.
- The invention relates to a system used in the construction sector to fix the armours during concreting.
- This novel system can be manufactured by companies from different sectors: plastic, metal, wood, etc.

COL·LABORACIÓ BUSCADA

Companies interested in acquiring this technology for commercial exploitation by:

- Utility model license agreement.
- Development of new applications.
- Agreements regarding technology and knowledge transfer.
- Technical reports and scientific advice for companies.
- Specific training, tailored to the needs of the company.
- Technological support in those techniques that require high training or sophisticated instruments that are not available to the applicant company.
- Exchange of personnel for defined periods of time (learning techniques, etc.).
- Rental of internal equipment for customers wishing to carry out their own tests (infrastructure of the Department of Building and Urban Planning, or Technical Research Services (SSTTI) of the University of Alicante).

DRETS DE PROPIETAT INTEL·LECTUAL

This technology is protected by a utility model application:

- Title: “System for fixing armours during concreting”
- Application number: U201700526
- Application date: March 30, 2017

SECTORS D'APLICACIÓ (2)

Construction and Architecture
Toys