

L'invention est relative à un procédé de réalisation d'une liaison mécanique de ronds à béton, à une telle liaison obtenue par le procédé, à un rond à béton autorisant la mise en oeuvre du dit procédé, ainsi qu'à une
5 installation de préparation de ronds à béton. Elle trouvera notamment son application dans le domaine de la construction d'éléments, de bâtiments, ou d'édifices en béton.

Dans ce domaine, il est courant d'utiliser des
10 liaisons mécaniques pour lier des ronds à béton afin de pouvoir assurer la transmission de l'effort de traction de façon continue.

De nos jours, différentes solutions sont proposées par les constructeurs, et principalement on
15 utilise soit une liaison à sertissage, soit une liaison par filetage.

Dans le cas de la liaison par sertissage, on utilise un manchon que l'on vient sertir sur les deux extrémités des ronds à liasonner. Cette technique évite de
20 devoir mettre en rotation l'un des ronds mais présente toutefois des risques élevés de glissement, du fait du sertissage, difficilement contrôlable. En outre, sa mise en oeuvre est souvent mal aisée sur un chantier car il faut pouvoir intervenir avec un outillage de sertissage, là où
25 la liaison est à effectuer.

De plus en plus, la liaison mécanique par filetage a la préférence des utilisateurs. Dans une telle liaison, on réunit deux ronds à béton, sensiblement coaxialement, par l'intermédiaire d'un manchon taraudé de
30 liaison. Cette solution est également applicable lorsqu'il est nécessaire de liasonner un rond à béton à un point d'ancrage.

Par ailleurs, pour améliorer la qualité de la liaison mécanique de ronds à béton par filetage, il a été
35 mis au point un procédé de réalisation d'une telle liaison dans lequel, préalablement au filetage, on refoule à froid l'extrémité des ronds à béton à liasonner, afin de réaliser une zone renforcée d'un diamètre supérieur à la section nominale du rond, puis on taille le filetage sur la

dite zone renforcée tel que le diamètre à fond de filet soit égal ou supérieur à la section nominale du rond à béton.

5 Un tel procédé donne satisfaction dans la plupart des constructions et requiert un usinage très sommaire. En effet, l'extrémité du rond à béton, avec ses côtes ou nervures est refoulée à froid dans une matrice, puis le filetage est réalisé sur ce refoulement brut par taillage.

10 Bien que le refoulement soit généralement limité à un taux d'accroissement du diamètre de l'ordre de 30 %, il est nécessaire néanmoins de mettre en oeuvre des pressions lors du refoulement de très forte valeur pouvant aller jusqu'à 400 voire même 500 bars.

15 Par ailleurs, il est à noter que de plus en plus, les édifices en béton sont soumis à des efforts dynamiques, et dans ces conditions, les liaisons mécaniques de ronds à béton sont soumises à des effets de traction-compression alternés. Aussi, la fragilité de telles
20 liaisons est augmentée et il est nécessaire de prévoir ces sollicitations pour qu'elles résistent sur le plan de l'insécurité.

Le but de la présente invention est de proposer un procédé de réalisation de liaisons mécaniques de ronds à
25 béton qui apportent une sécurité totale au niveau de la liaison et qui, pour un même dimensionnement, supportent des sollicitations dynamiques avec un effet de traction-compression alterné.

Un des buts de la présente invention est de
30 proposer un procédé de réalisation d'une liaison mécanique de rond à béton qui permette de réaliser, à l'extrémité du rond à béton, une zone renforcée telle que le diamètre à fond de filet soit égal ou supérieur à la section nominale du rond à béton, mais qui nécessite un refoulement à froid
35 de l'extrémité moindre, et par conséquent mettant en oeuvre des forces de refoulement moins importantes.

Un autre but de la présente invention est de proposer un procédé de réalisation d'un liaison mécanique de rond à béton qui met en oeuvre un filetage de très bonne

qualité avec de bonnes tolérances qui n'amoin-drit pas la résistance de l'extrémité.

5 En particulier, le filetage est réalisé par roulage, ce qui évite de tailler les fibres de la barre et de provoquer des amorces de rupture lors des efforts dynamiques.

10 Un autre but de la présente invention est de proposer une liaison mécanique de ronds à béton ainsi qu'un rond à béton autorisant la mise en oeuvre du procédé de la présente invention.

15 Par ailleurs, un autre but de la présente invention est de proposer une installation de préparation de tels ronds à béton qui soit économique, d'un investissement raisonnable et de dimension réduite étant données les forces mises en oeuvre.

20 D'autres buts et avantages de la présente invention apparaîtront au cours de la description qui va suivre qui n'est cependant donnée qu'à titre indicatif et qui n'a pas pour but de la limiter.

25 Selon l'invention, le procédé de réalisation d'une liaison mécanique de rond à béton, qui trouvera notamment son application dans le domaine de la construction en béton, par lequel on liaisonne au moins un rond à béton à un autre rond à béton ou à un point d'ancrage, par l'intermédiaire d'un manchon taraudé de liaison, le dit rond à béton présentant une section nominale Φ , au moins une extrémité renforcée, refoulée et filetée, telle que le diamètre à fond de filet soit égal ou supérieur à la section nominale Φ du rond, est caractérisé
30 par le fait que l'on effectue l'extrémité renforcée par double refoulement, un premier axial permettant d'accroître le diamètre du rond à béton, un second radial lors du filetage par la technique de roulage.

35 Le procédé de l'invention permet d'aboutir à une liaison mécanique d'un rond à béton à un point d'ancrage ou à une liaison mécanique de deux ronds à béton bout à bout sensiblement coaxialement.

Par ailleurs, le rond à béton autorisant la mise en oeuvre du procédé de l'invention est caractérisé

par le fait qu'au moins une de ses extrémités porte un double refoulement tel que le diamètre à fond de filet soit supérieur ou égal à la section nominale du rond à béton.

L'installation de préparation de rond à béton selon l'invention est quant à elle caractérisée par le fait qu'elle présente :

a) des moyens d'immobilisation du rond à béton à préparer,

b) des moyens pour refouler à froid axialement l'extrémité du rond à béton,

c) des moyens pour écrouter la portée à refouler et/ou à fileter,

d) des moyens pour réaliser un filetage par roulage de la dite extrémité,

les dits moyens b), c), d), étant déplaçables pour être placés coaxialement dans l'axe du rond à béton bloqué dans les moyens a).

La présente invention sera mieux comprise à la lecture de la description suivante accompagnée des dessins qui en font partie intégrante.

La figure 1 montre une liaison mécanique de rond à béton réalisée selon le procédé de la présente invention.

Les figures 2a à 2d montrent les différentes étapes du procédé de réalisation de la liaison mécanique de rond à béton selon l'invention, et plus précisément le travail de l'extrémité du rond à béton mis en oeuvre dans le procédé.

La figure 3 montre une vue en coupe, agrandie, montrant les caractéristiques dimensionnelles de l'extrémité du rond à béton de la figure 2d.

La figure 4 montre schématiquement l'agencement des différents moyens constituant l'installation de préparation de rond à béton selon la présente invention.

L'invention vise un procédé de réalisation d'une liaison mécanique de rond à béton, une liaison ainsi obtenue ainsi qu'un rond à béton autorisant la mise en oeuvre du dit procédé et une installation de préparation de tels ronds.

Elle trouvera notamment son application dans le domaine de la construction en béton.

La figure 1 montre un exemple de réalisation d'une liaison mécanique permettant d'assurer la liaison de deux ronds à béton 1 et 2, bout à bout, sensiblement coaxialement. Par ailleurs, cette liaison met en oeuvre un manchon taraudé 3 de liaison, apte à recevoir respectivement d'un côté l'extrémité filetée 4 du premier rond à béton 1, et de l'autre côté l'extrémité 5 du second rond à béton 2.

Chacun des ronds à béton est déterminé par le calcul puis choisi parmi une gamme normalisée ou réglementée. La caractéristique d'un rond à béton réside essentiellement dans une imposition de poids et de section, ceux-ci étant laminés compte tenu de ces impératifs.

D'une façon générale, le rond à béton présente sur sa face extérieure des côtes ou nervures 6 qui créent de protubérances permettant l'immobilisation en translation du rond dans le béton lorsqu'il est noyé dans ce dernier.

Dans ces conditions, le rond présente d'une part une section nominale caractérisée par Φ , qui est en quelque sorte la section de l'âme du rond, et un diamètre sur côtes ou nervures repéré Φ_c , comme l'illustre particulièrement la figure 2a.

Selon le procédé de la présente invention, chaque rond à béton à liaisonner 1, 2 présente au moins une extrémité renforcée 4, 5, refoulée et filetée, tel que le diamètre à fond de filet d_2 soit égal ou supérieur à la section nominale Φ du rond. Ceci est particulièrement illustré aux figures 2d et 3.

Plus précisément, selon le procédé, on effectue l'extrémité renforcée 4, 5, par double refoulement, un premier axial 7, permettant d'accroître le diamètre du rond à béton, et un second radial 8 lors du filetage par une technique de roulage.

Le premier refoulement axial 7 est réalisé préalablement au filetage, et on refoule à froid l'extrémité du rond à béton 1, 2, à liaisonner afin de réaliser une zone renforcée 7 correspondant au moins

sensiblement au diamètre d_4 à flancs de filet.

Ensuite, on pratique le second refoulement radial 8 en réalisant un filetage 9 sur la dite zone renforcée 7 par roulage afin que le diamètre à fond de
5
filet d_2 soit égal ou supérieur à la section nominale Φ du rond.

Cela étant, d'une façon générale, les refoulements 7, 8 sont effectués sur la longueur du filetage 9 de la dite extrémité 4, 5.

10 Les différentes étapes du procédé sont illustrées aux figures 2a à 2d.

A la figure 2a, on montre un premier écroutage de l'extrémité du rond à renforcer pour le débarrasser de ses côtes ou nervures et pour donner à cette extrémité une
15 cylindricité acceptable. Cet écroutage est repéré par le diamètre d_0 voisin ou très légèrement inférieur du diamètre Φ .

Sur cette extrémité 4 ainsi préparée, on procède au premier refoulement 7 à un taux d'accroissement du diamètre de l'extrémité voisin de 15 à 20 %. Cette étape
20 porte le diamètre d_0 à un diamètre supérieur d_3 , lui-même supérieur au diamètre Φ du rond. Ce refoulement à froid est réalisé en effectuant une poussée axiale sur l'extrémité selon la flèche 10.

25 Ensuite, comme le montre la figure 2c, on dresse la portée refoulée 7, notamment pour la calibrer, au diamètre d_4 qui va permettre d'effectuer le filetage souhaité par roulage.

Selon la technique de roulage, ce diamètre d_4
30 correspond au diamètre à flancs de filet montré sur la figure 3. Pendant le roulage, on va ensuite repousser le métal pour constituer le fond de filet d_2 et le refouler pour constituer la partie extérieure du filetage d_1 .

Dans ces conditions, on parvient à l'extrémité
35 telle que repérée à la figure 2d dans laquelle celle-ci, après un double refoulement axial 7 et radial 8, montre une extrémité renforcée telle que le diamètre à fond de filet d_2 soit égal ou supérieur à la section nominale Φ du rond.

Par ailleurs, pour résister au test de traction

imposé par certaines normes de sécurité, l'extrémité 4 et/ou 5 du rond à béton 1 et/ou 2 renforcé par refoulement, est précontrainte.

Cette précontrainte permet d'annuler tous les déplacements et allongements des ronds à béton et notamment de leurs extrémités lors de tests de sécurité mis en oeuvre. Elle est effectuée postérieurement au filetage, mécaniquement par compression de la dite extrémité filetée.

Le procédé qui vient d'être décrit permet la réalisation d'une liaison mécanique de deux ronds à béton bout à bout sensiblement coaxialement. Cependant, ce procédé peut être adapté pour obtenir une liaison mécanique d'un rond à béton à un point d'ancrage.

Dans ce cas, le manchon sera adapté à la réception d'un seul rond mais présentera une configuration extérieure en forme de douille d'ancrage.

Cela étant, à titre d'exemple, dans le cas d'un rond à béton HA20 de section nominale 20 mm, on pratique sur son extrémité un filetage M24 de tolérance 6g.

Après un écroutage de l'extrémité du rond, on a mené le refoulement axial pour obtenir un diamètre d_3 de 23 mm.

Ensuite, on a mené un cylindrage de l'extrémité ainsi refoulée pour ramener le diamètre d_4 compris entre 21,803 et 22,003 mm.

Sur cette extrémité calibrée, on a réalisé le filetage M24 au pas de 3 par roulage. Le diamètre extérieur d_1 étant alors compris entre 23,577 et 23,952 mm, et le diamètre à fond de filet d_2 correspondant alors à 20,704 mm soit supérieur au 20 mm de la section nominale du rond HA20.

De même, en partant d'un rond à béton HA de 20 mm, pour obtenir un diamètre M24 au pas de deux, compte tenu de la normalisation des filetages, il faut partir d'un diamètre primitif égal au diamètre à flancs de filet situé entre 22,493 et 22,603 mm.

Par rapport à la solution antérieure dans laquelle on refoulait à froid en une seule étape l'extrémité du rond à béton puis on taillait le filetage,

il est à noter un gain important car la masse refoulée nécessaire est beaucoup plus faible.

Antérieurement, il fallait obtenir un refoulement extérieur de l'ordre de 27 mm, soit un déplacement de masse de l'ordre de 50 g et une longueur de 20 mm.

Selon la présente invention, le refoulement axial nécessaire engendre un déplacement d'une masse de 18 g ou une longueur de 8 mm. Le refoulement axial est donc diminué de 50 à 18 g soit un rapport diminué de 2,8.

Par ailleurs, la qualité du filetage permet d'abandonner la tolérance 8g et de mettre en oeuvre des tolérances 5 ou 6 g.

La figure 4 montre schématiquement une installation de préparation de ronds à béton pour autoriser la mise en oeuvre du procédé de la présente invention.

L'installation comporte tout d'abord une zone d'aménagement du rond à béton à préparer. Dans cette zone est prévu un étau 10 qui va pouvoir serrer le rond à béton 1 et le déplacer vers l'installation.

A la suite de cette zone, sont prévus des moyens 11 d'immobilisation du rond à préparer. Ces moyens sont par exemple constitués par un étau 11 de grande longueur, notamment garnis de revêtement type caoutchouc naturel ou polyuréthane pour éviter les blessures des ronds à béton.

L'avantage de présenter une grande longueur d'étau permet de disposer d'une surface importante et d'une relative faiblesse de compression au mètre carré.

Les étaux 10 et 11 sont du type hydraulique et déplaçable horizontalement par rapport à l'axe longitudinal 22 d'amenée des ronds à béton.

Les différentes flèches sur la figure 4 simulent le fonctionnement du système et notamment le fonctionnement suivant : l'étau 10 serre le rond à béton, l'étau d'immobilisation 11 s'ouvre, l'étau 10 se déplace vers l'avant, l'étau 11 se resserre sur le rond, l'étau 10 se libère et recule pour se préparer à un nouveau cycle.

Devant l'étau d'immobilisation 11 seront prévus

à coulisement, une cisaille 12, des moyens 13 pour refouler à froid axialement l'extrémité des ronds, ainsi qu'une unité de contrainte mécanique par compression de l'extrémité filetée du rond.

5 Ceci sera notamment possible en prévoyant des glissières 15 devant l'étau afin d'autoriser un déplacement vertical des trois outils 12-14 comme le suggèrent les figures, pour être placés coaxialement dans l'axe 22 du rond bloqué en 11.

10 Dans ces conditions, on pourra travailler le rond à béton sans devoir modifier son positionnement, celui-ci étant bloqué une fois pour toute dans l'étau 11.

De même, l'installation présentera des moyens 16, 17 pour écrouter la portée à refouler et/ou à fileter.
15 Ces moyens seront prévus à déplacement vertical et horizontal pour pouvoir amener l'outil d'écroutage dans l'axe 22 longitudinal du rond à béton à travailler.

Par ailleurs, l'installation comportera, dans le même esprit, des moyens 18 pour réaliser un filetage par
20 roulage, c'est-à-dire que l'unité 18 sera apte à être déplacée pour être placée coaxialement dans l'axe 22 bloqué dans les moyens 11.

Enfin, l'installation présentera également une unité 19 de vissage et dévissage d'un manchon permettant la
25 mise en oeuvre de la dite contrainte dans l'outil 14.

Le principal avantage de l'installation de la présente invention réside dans le fait que toutes les opérations sont menées sans devoir déplacer le rond à béton ni le repositionner et évitent ainsi tous les
30 positionnements et centrages qui seraient obligatoires pour mener les différentes étapes d'usinage.

Ainsi, on pourra réaliser sur le rond à béton, et plus précisément sur les extrémités un renforcement par double refoulement, un premier axial par les moyens 13 de
35 refoulement à froid, et un second radial lors du filetage par l'outil de roulage 18. Cette façon de faire permet de diminuer les pressions de refoulement à froid, de faciliter le refoulement à froid en travaillant sur un diamètre usiné, d'éliminer la surface trempée, c'est-à-dire la peau

du rond à béton, et ses nervures grâce à l'écroutage.

Naturellement, d'autres mises en oeuvre de la présente, à la portée de l'homme de l'art, auraient pu être envisagées sans pour autant sortir du cadre de la présente demande.



REVENDECATIONS

1. Procédé de réalisation d'une liaison mécanique de ronds à béton, qui trouvera notamment son application dans le domaine de la construction en béton, par lequel on liaisonne au moins un rond à béton (1) à un autre rond à béton (2), ou à un point d'ancrage, par l'intermédiaire d'un manchon taraudé de liaison (3), le dit rond à béton (1) présentant une section nominale Φ , et au moins une extrémité (4) renforcée, refoulée et filetée, telle que le diamètre à fond de filet d_2 soit égal ou supérieur à la section nominale Φ du rond, caractérisé par le fait que l'on effectue l'extrémité renforcée (4) par double refoulement, un premier axial (7) permettant d'accroître le diamètre du rond à béton, un second radial (8) lors du filetage par une technique de roulage.

2. Procédé selon la revendication 1, caractérisé par le fait que :

- préalablement au filetage, on refoule à froid l'extrémité (4) du rond à béton à liaisonner afin de réaliser une zone renforcée de diamètre correspondant au moins sensiblement au diamètre à flancs de filet d_4 ,

- on réalise un filetage (9) sur la dite zone renforcée (7) par roulage afin que le diamètre à fond de filet d_2 soit égal ou supérieur à la dite section nominale Φ .

3. Procédé selon la revendication 1, caractérisé par le fait que les refoulements (7, 8) sont effectués sur la longueur de filetage de la dite extrémité (4).

4. Procédé selon la revendication 1, caractérisé par le fait qu'on réalise le premier refoulement (7) à un taux d'accroissement du diamètre de l'extrémité voisin de 15 %.

5. Procédé selon la revendication 1, caractérisé par le fait que postérieurement au filetage de la dite extrémité refoulée, on contraint mécaniquement par compression la dite extrémité filetée.

6. Procédé selon la revendication 2, caractérisé par le fait que :



- on écroute l'extrémité du rond brut pour ôter les nervures extérieures,

5 - on refoule à froid en réalisant une poussée axiale sur l'extrémité afin d'obtenir un diamètre voisin du diamètre à flancs de filet d_4 ,

- on dresse la portée refoulée pour la calibrer et effectuer le filetage souhaité par roulage.

10 7. Liaison mécanique d'un rond à béton à un point d'ancrage, obtenu par la mise en oeuvre du procédé selon l'une quelconque des revendications 1 à 6.

8. Liaison mécanique de rond à béton bout à bout sensiblement coaxialement obtenu par la mise en oeuvre du procédé selon l'une quelconque des revendications 1 à 6.

15 9. Rond à béton autorisant la mise en oeuvre du procédé selon l'une quelconque des revendications 1 à 6, caractérisé par le fait qu'au moins une de ses extrémités (4) porte un double refoulement (7, 8) tel que le diamètre à fond de filet d_2 soit supérieur ou égal à la section nominale du rond à béton Φ .

20 10. Installation de préparation de ronds à béton pour autoriser la mise en oeuvre du procédé selon l'une quelconque des revendications 1 à 6, caractérisée par le fait qu'elle présente :

25 a) des moyens (11) d'immobilisation du rond (1) à préparer,

b) des moyens (13) pour refouler à froid axialement l'extrémité (4) du rond à béton,

c) des moyens (16, 17) pour écrouter la portée à refouler et/ou à fileter,

30 d) des moyens (18) pour réaliser un filetage par roulage de la dite extrémité,
les dits moyens b), c), d) étant déplaçables pour être placés coaxialement dans l'axe (22) du rond à béton bloqué dans les moyens d'immobilisation (11).

ABREGE DESCRIPTIF

L'invention est relative à un procédé de réalisation d'une liaison mécanique de ronds à béton ainsi qu'à une telle liaison mécanique et à un rond à béton autorisant la mise en oeuvre du procédé, et à une installation de préparation de ronds à béton.

Elle trouvera son application dans le domaine de la construction en béton.

Par le procédé, on liaisonne au moins un rond à béton (1) à un autre rond à béton (2), ou à un point d'ancrage, par l'intermédiaire d'un manchon (3) taraudé de liaison, le dit rond à béton présentant une section nominale Φ , et au moins une extrémité renforcée (4), refoulée et filetée, telle que le diamètre à fond de filet d_2 soit égal ou supérieur à la section nominale Φ du rond.

Selon l'invention, on effectue l'extrémité renforcée (4) par double refoulement, un premier axial permettant d'accroître le diamètre du rond à béton, un second radial lors du filetage par une technique de roulage.

Figure 1.

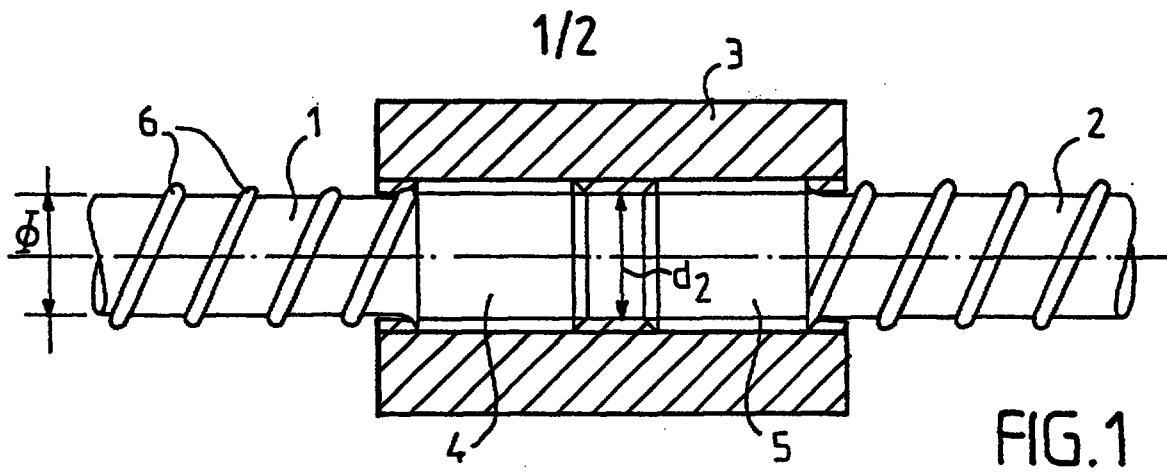


FIG. 1

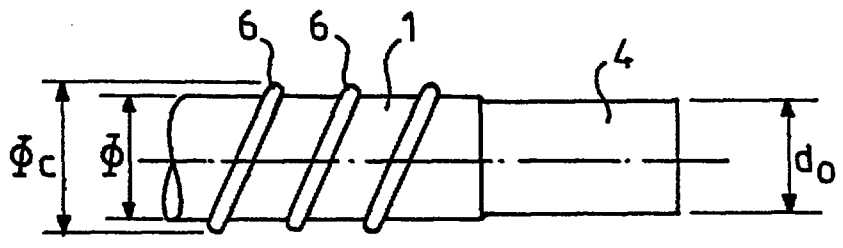


FIG. 2a

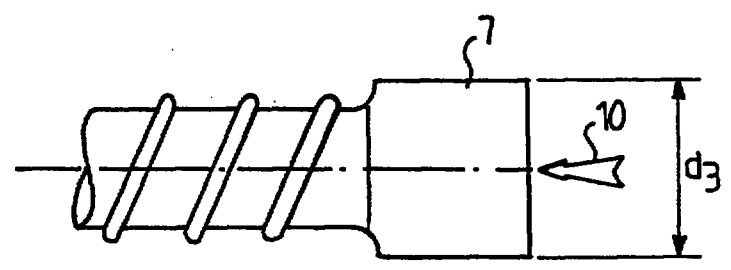


FIG. 2b

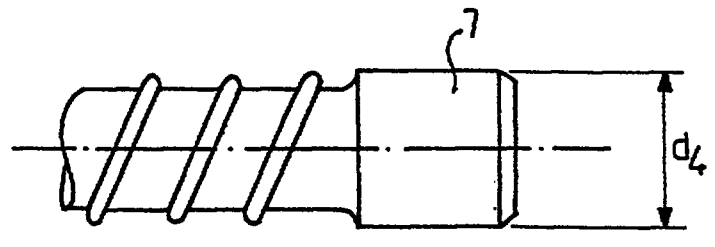


FIG. 2c

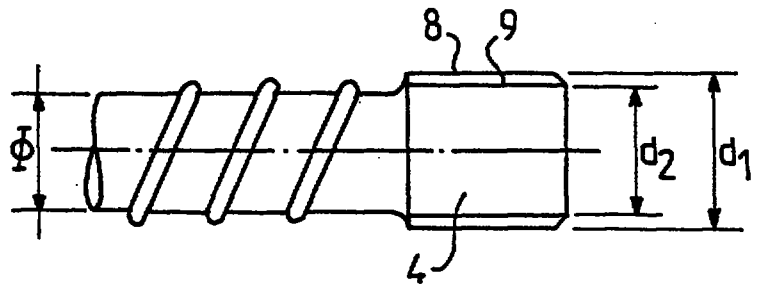
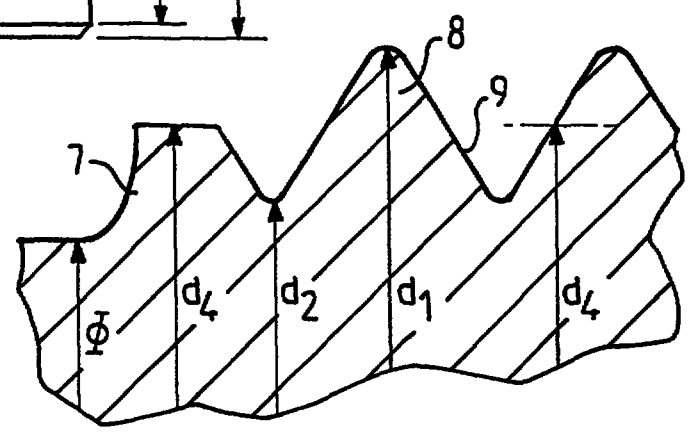


FIG. 2d

FIG. 3



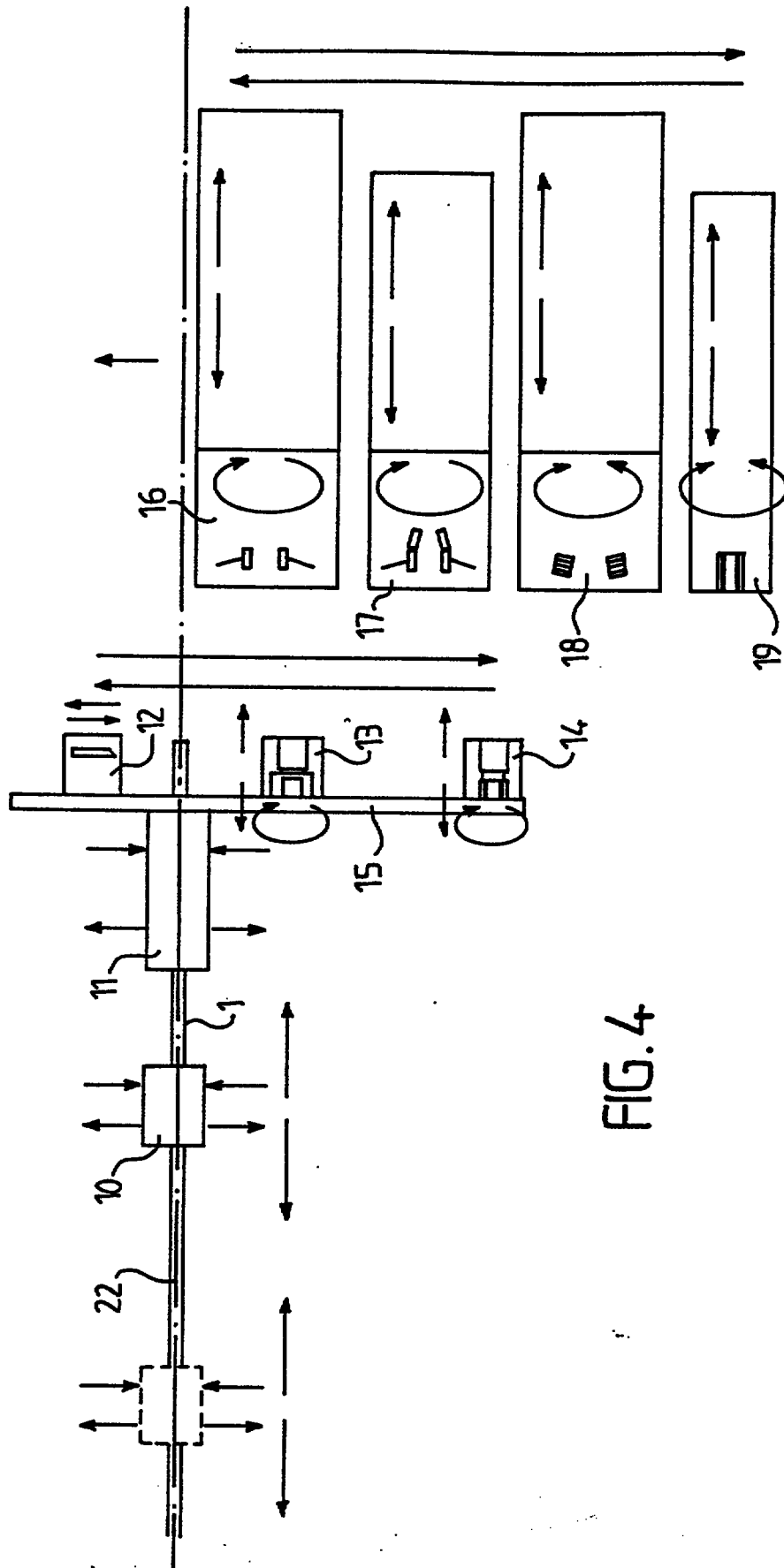


FIG. 4

REPLACED SHEETS SG

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	☒ Drawing(s)	: paged 11/2 to paged 21/2
	☒ Abstract	: paged 16 to paged 17

The invention relates to a method for the creation of a mechanical connection of round bars for concrete, to such a connection obtained by the method, to a round bar for concrete permitting the implementation of said method, and also to an installation for the preparation of round bars for concrete. It will be used in particular in the field of the construction of elements, of buildings or of edifices made of concrete.

In this field, it is customary to use mechanical connections to link round bars for concrete so as to be able to ensure the transmission of tensile stress in a continuous manner.

Nowadays, various solutions are proposed by builders and principally either a setting connection or a fillet connection is used.

In the case of connection by setting, a sleeve is used which is brought to be set on the two ends of the round bars which are to be connected. This technique avoids having to set one of the round bars in rotation, but nevertheless presents high risks of slipping, owing to the setting which is difficult to control. Furthermore, its implementation is often difficult on site because one must be able to intervene with setting tools at the place where the connection is to be carried out.

Increasingly, mechanical connection by filleting is preferred by users. In such a connection, two round bars for concrete are joined, substantially coaxially, by means of a tapped connection sleeve. This solution is likewise applicable when it is necessary to connect a round bar for concrete to an anchorage point.

In addition, to improve the quality of the mechanical connection of round bars for concrete by filleting, a method has been perfected for creating such a connection in which, prior to the filleting, the end of the round concrete bars

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which are to be connected is upset, cold, so as to create a reinforced zone having a diameter greater than the nominal section of the round bar, then the filleting is cut on the said reinforced zone such that the diameter at the base of the fillet is equal to or greater than the nominal section of the round bar for concrete.

Such a method is satisfactory in the majority of constructions and requires a very brief machining. In fact, the end of the round bar for concrete, with its grooves or ribs, is upset, cold, in a matrix then the filleting is carried out on this crude upsetting by cutting.

Although the upsetting is generally limited to a rate of increase in diameter in the order of 30 %, it is nevertheless necessary to use pressures, during upsetting, having a very high value, which are able to extend up to 400, even 500 bars.

In addition, it is to be noted that increasingly concrete edifices are subject to dynamic stresses, and under these conditions the mechanical connections of round bars for concrete are subject to alternate traction-compression effects. Also, the fragility of such connections is increased and it is necessary to anticipate these stresses so that they resist from the point of view of insecurity.

The aim of the present invention is to propose a method for the creation of mechanical connections of round bars for concrete which bring a total security to the connection and which, for the same dimensioning, bear dynamic stresses with an alternate traction-compression effect.

One of the aims of the present invention is to propose a method for the creation of a mechanical connection of round bars for concrete which permits the creation, at the end of the round bar for concrete, of a reinforced zone such that the diameter at the base of the fillet is equal to or greater than the nominal



section of the round bar for concrete, but which necessitates a cold upsetting of the lesser end, and consequently putting into operation smaller upsetting forces.

Another aim of the present invention is to propose a method for creating a mechanical connection of round bars for concrete which uses a very high quality filleting with good tolerances which does not reduce the resistance of the end.

In particular, the filleting is carried out by rolling, which avoids cutting the fibres of the bar and causing incipient fractures in the case of dynamic stresses.

Another aim of the present invention is to propose a mechanical connection of round bars for concrete and also a round bar for concrete permitting the implementation of the method of the present invention.

In addition, another aim of the present invention is to propose an installation for the preparation of such round bars for concrete which is economical, entails a reasonable investment and is of reduced dimensions, given the forces which are used.

Other aims and advantages of the present invention will become apparent in the course of the following description which is only given, however, by way of an indication and which does not aim to limit the invention.

According to the invention, the method for creating a mechanical connection of round bars for concrete, which will be used in particular in the field of construction in concrete, by which at least one round bar for concrete is connected to another round bar for concrete or to an anchorage point, by means of a tapped connection sleeve, said round bar for concrete having a nominal section Φ , at least one reinforced end, upset and filleted, such that the



diameter of the base of the fillet is equal to or greater than the nominal section Φ of the round bar, is characterised in that the reinforced end is effected by double upsetting, a first axial upsetting allowing the diameter of the round bar for concrete to increase, and a second radial upsetting when filleting is carried out by the rolling technique.

The method of the invention allows a mechanical connection of a round bar for concrete to an anchorage point to be produced, or a mechanical connection of two round bars for concrete end to end substantially coaxially.

In addition, the round bar for concrete permitting the method of the invention to be implemented is characterised in that at least one of its ends has a double upsetting such that the diameter of the base of the fillet is greater than or equal to the nominal section of the round bar for concrete.

The installation for preparing round bars for concrete according to the invention is as regards itself characterised in that it has:

- a) means for immobilising the round bar for concrete which is to be prepared,
 - b) means for the cold upsetting axially of the end of the round bar for concrete,
 - c) means for removing the surface from the extent which is to be upset and/or filleted,
 - d) means for carrying out a filleting by rolling of the said end,
- said means b), c), d) being movable so as to be placed coaxially in the axis of the round bar for concrete which is locked in the means a).

The present invention will be understood better on reading the following description accompanied by drawings which form an integral part thereof.



Figure 1 shows a mechanical connection of a round bar for concrete according to the method of the present invention.

Figures 2a to 2d show the different stages in the method for creating the mechanical connection of a round bar for concrete according to the invention, and more precisely the working of the end of the round bar for concrete carried out in the method.

Figure 3 shows a sectional view, on an enlarged scale, showing the dimensional characteristics of the end of the round bar for concrete of Figure 2d.

Figure 4 shows diagrammatically the arrangement of the various means constituting the installation for preparing the round bar for concrete according to the present invention.

The invention aims at a method for creating a mechanical connection of a round bar for concrete, a connection thus obtained and also a round bar for concrete permitting said method to be implemented, and an installation for preparing such round bars.

It will be used in particular in the field of construction in concrete.

Figure 1 shows an example embodiment of a mechanical connection permitting the connection to be ensured of two round bars for concrete 1 and 2, end to end, substantially coaxially. In addition, this connection uses a tapped connection sleeve 3, suited to receiving respectively on one side the filleted end 4 of the first round bar for concrete 1 and on the other side the end 5 of the second round bar for concrete 2.

Each of the round bars for concrete is determined by calculation then selected from a standardized or regulated range. The characteristic of a round bar for concrete lies essentially in an imposition of weight and section, these being rolled taking into account these requirements.

Generally, the round bar for concrete has on its external surface grooves or ribs 6 which create protuberances permitting the round bar to be immobilised in translation in the concrete when it is embedded in the latter.

Under these conditions, the round bar has on the one hand a nominal section characterised by Φ which is, as it were, the section of the core of the round bar, and a diameter on the grooves or ribs marked Φ_c as illustrated in particular by Figure 2a.

According to the method of the present invention, each round bar for concrete 1, 2 which is to be connected has at least one reinforced end 4, 5, which is upset and filleted such that the diameter of the base of the fillet d_2 is equal to or greater than the nominal section Φ of the round bar. This is illustrated particularly in Figures 2d and 3.

More precisely, according to the method, the reinforced end 4, 5 is effected by double upsetting, a first axial upsetting 7 permitting the diameter of the round bar for concrete to be increased, and a second radial upsetting 8 during filleting by a rolling technique.

The first axial upsetting 7 is carried out prior to the filleting, and cold upsetting is carried out on the end of the round bar for concrete 1, 2 which is to be connected, so as to create a reinforced zone 7 corresponding at least substantially to the diameter d_4 of the fillet sides.

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Then the second radial upsetting 8 is carried out, creating a filleting 9 on the said reinforced zone 7 by rolling so that the diameter at the base of the fillet d_2 is equal to or greater than the nominal section Φ of the round bar.

This being so, in a general manner, the upsettings 7, 8 are carried out on the length of the filleting 9 of the said end 4, 5.

The different stages of the method are illustrated in Figures 2a to 2d.

In Figure 2a, a first removal of the surface of the end of the round bar to be reinforced is shown, to rid it of its grooves or ribs and to give this end an acceptable cylindrical form. This surface removal is marked by the diameter d_0 close to or very slightly less than the diameter Φ .

On this end 4 which has been prepared in this way, one proceeds with the first upsetting 7 at a rate of increase of the diameter of the end close to 15 to 20 %. This stage brings the diameter d_0 to a greater diameter d_3 , which is itself greater than diameter Φ of the round bar. This cold upsetting is realised by carrying out an axial pressure on the end in accordance with the arrow 10.

Then, as shown by Figure 2c, the upset extent 7 is adjusted, in particular to calibrate it, to the diameter d_4 which will allow the desired filleting to be carried out by rolling.

According to the rolling technique, this diameter d_4 corresponds to the diameter of the fillet sides shown in Figure 3. During rolling, the metal will then be pushed back to constitute the base of the fillet d_2 and will be upset to constitute the exterior part of the filleting d_1 .



Under these conditions, one arrives at the end as marked in Figure 2d in which the latter, after a double axial upsetting 7 and radial upsetting 8, shows a reinforced end such that the diameter at the base of the fillet d_2 is equal to or greater than the nominal section Φ of the round bar.

In addition, to resist the traction test which is imposed by certain safety standards, the end 4 and/or 5 of the round bar for concrete 1 and/or 2, reinforced by upsetting, is pre-stressed.

This pre-stressing allows all the displacements and elongations of the round bars for concrete to be cancelled and in particular of their ends when safety tests are carried out. It is carried out after the filleting, mechanically by compression of the said filleted end.

The method which has just been described permits the realisation of a mechanical connection of two round bars for concrete end to end, substantially coaxially. However, this method can be adapted to obtain a mechanical connection of a round bar for concrete to an anchorage point.

In this case, the sleeve will be adapted to receive a single round bar, but will have an exterior configuration in the form of an anchorage socket.

This being the case, by way of example, in a round bar for concrete HA20 of nominal section 20 mm, a filleting M24 of tolerance 6g is made on its end.

After a removal of the surface of the end of the round bar, the axial upsetting was carried out to obtain a diameter d_3 of 23 mm.

Then a rolling of the end thus upset was carried out to bring the diameter d_4 to be comprised between 21.803 and 22.003 mm.



On this calibrated end, the filleting M24 was carried out at a pitch of 3 by rolling. The exterior diameter d_1 is therefore comprised between 23.577 and 23.952 mm and the diameter of the base of the fillet d_2 therefore corresponds to 20.704 mm, namely greater than the 20 mm of the nominal section of the round bar HA20.

Likewise, starting from a round bar for concrete HA of 20 mm, to obtain a diameter M24 at a pitch of two, taking into account the standardisation of the filletings, one must start from a basic diameter equal to the diameter at the sides of the fillet placed between 22.493 and 22.603 mm.

With respect to the previous solution in which a cold upsetting was carried out in a single stage on the end of the round bar for concrete and then the filleting was cut, a great gain is to be noted, because the upset mass which is necessary is much less.

Previously, an exterior upsetting had to be obtained in the order of 27 mm, namely a displacement of mass in the order to 50 g and a length of 20 mm.

According to the present invention, the necessary axial upsetting brings about a displacement of a mass of 18 g or a length of 8 mm. The axial upsetting is therefore reduced from 50 to 18 g, namely a reduced ratio of 2.8.

In addition, the quality of the filleting allows the 8g tolerance to be abandoned and allows 5 or 6 g tolerances to be used.

Figure 4 shows diagrammatically an installation for the preparation of round bars for concrete to allow the implementation of the method of the present invention.



The installation firstly comprises a feeding zone of the round bar for concrete which is to be prepared. In this zone a vice 10 is provided, which will be able to grip the round bar for concrete 1 and move it towards the installation.

Following this zone, means 11 are provided for immobilising the round bar which is to be prepared. These means are, for example, constituted by a vice 11 having a great length, in particular provided with a covering of the natural rubber or polyurethane type to avoid damage to the round bars for concrete.

The advantage of offering a great length for the vice allows one to have a large area at one's disposal and a relative weakness of compression per square metre.

The vices 10 and 11 are of the hydraulic type, displaceable horizontally in relation to the longitudinal axis 22 for feeding the round bars for concrete.

The various arrows in Figure 4 simulate the functioning of the system and in particular the following functioning: the vice 10 grips the round bar for concrete, the immobilisation vice 11 opens, the vice 10 moves forward, the vice 11 grips around the round bar, the vice 10 releases itself and moves back to prepare a new cycle.

In front of the immobilisation vice 11 there will be provided in sliding arrangement: a cutter 12, means 13 for the cold upsetting axially of the end of the round bars, and also a unit for mechanical stress by compression of the filleted end of the round bar.

This will be possible in particular by providing slides 15 in front of the vice so as to permit a vertical displacement of the three tools 12-14 as suggested by the figures, to be placed coaxially in the axis 22 of the locked round bar at 11.



Under these conditions, the round bar for concrete will be able to be worked without having to alter its positioning, this being locked once and for all in the vice 11.

Likewise, the installation will offer means 16, 17 for removing the surface from the extent which is to be upset and/or filleted. These means will be provided with vertical and horizontal displacement so as to be able to bring the surface removal tool in the longitudinal axis 22 of the round bar for concrete which is to be worked.

In addition, the installation will comprise, in the same sense, means 18 to create a filleting by rolling, i.e. the unit 18 will be suited to being displaced so as to be placed coaxially in the axis 22 locked in the means 11.

Finally, the installation will likewise offer a unit 19 for screwing and unscrewing a sleeve, permitting the utilisation of the said stress in the tool 14.

The main advantage of the installation of the present invention lies in that all the operations are carried out without having to move the round bar for concrete or having to reposition it and thus avoid all the positioning and centering operations which would be obligatory in order to carry out the various machining stages.

Thus, on the round bar for concrete and more precisely on the ends thereof, a reinforcement will be able to be carried out by double upsetting, a first axial upsetting by the means 13 for cold upsetting, and a second radial upsetting during filleting by the rolling tool 18. This manner of procedure allows the cold upsetting pressures to be reduced, allows the cold upsetting to be facilitated by working on a machined diameter, allows the hardened surface to be eliminated,



i.e. the skin of the round bar for concrete, and its ribs, due to the surface removal.

Of course, other forms of embodiment of the present invention, within the scope of the specialist in the art, could have been envisaged without, however, departing from the framework of the present application.

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Claims

1. A method for the creation of a mechanical connection of round bars for concrete, which will be used in particular in the field of construction in concrete, by which at least one round bar for concrete (1) is connected to another round bar for concrete (2), or to an anchorage point, by means of a tapped connection sleeve (3), said round bar for concrete (1) having a nominal section Φ , and at least one reinforced end (4), upset and filleted, such that the diameter at the base of the fillet d_2 is equal to or greater than the nominal section Φ of the round bar, characterised in that the reinforced end (4) is effected by double upsetting, a first axial upsetting (7) allowing the diameter of the round bar for concrete to increase, and a second radial upsetting (8) when filleting is carried out by a rolling technique.

2. A method according to Claim 1, characterised in that:

- prior to filleting, the end (4) of the round bar for concrete which is to be connected undergoes a cold upsetting so as to create a reinforced zone having a diameter corresponding at least substantially to the fillet sides diameter d_4 ,
- a filleting (9) is carried out on said reinforced zone (7) by rolling so that the diameter at the base of the thread d_2 is equal to or greater than said nominal section Φ .

3. A method according to Claim 1, characterised in that the upsettings (7, 8) are carried out over the length of the filleting of the said end (4).

4. A method according to Claim 1, characterised in that the first upsetting (7) is carried out at a rate of increase of the diameter of the end which is close to 15 %.

5. A method according to Claim 1, characterised in that after the filleting of



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the said upset end, the said filleted end is stressed mechanically by compression.

6. A method according to Claim 2, characterised in that:

- the end of the crude round bar has its surface removed to take off the exterior ribs,
- a cold upsetting is carried out, creating an axial thrust on the end so as to obtain a diameter close to the fillet sides diameter d_4 ,
- the upset extent is adjusted to calibrate it and to carry out the desired filleting by rolling.

7. A mechanical connection of a round bar for concrete to an anchorage point, obtained by implementing the method according to any one of Claims 1 to 6.

8. A mechanical connection of round bars for concrete end to end substantially coaxially obtained by implementing the method according to any one of Claims 1 to 6.

9. A round bar for concrete permitting the implementation of the method according to any one of Claims 1 to 6, characterised in that at least one of its ends (4) carries a double upsetting (7, 8) such that the fillet base diameter d_2 is greater than or equal to the nominal section of the round bar for concrete Φ .

10. An installation for the preparation of round bars for concrete to permit the implementation of the method according to any one of Claims 1 to 6, characterised in that it has:

- a) means (11) for immobilising the round bar (1) which is to be prepared,
- b) means (13) for the cold upsetting axially of the end (4) of the round bar for concrete,
- c) means (16, 17) for removing the surface from the extent which is to be



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upset and/or filleted,

d) means (18) for carrying out a filleting by rolling of the said end,
said means b), c), d) being movable so as to be placed coaxially in the axis (22)
of the round bar for concrete which is locked in the immobilisation means (11).



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Descriptive Abstract

The invention relates to a method for the creation of a mechanical connection of round bars for concrete and also to such a mechanical connection and to a round bar for concrete permitting the method to be implemented, and to an installation for the preparation of round bars for concrete.

It will be used in the field of construction in concrete.

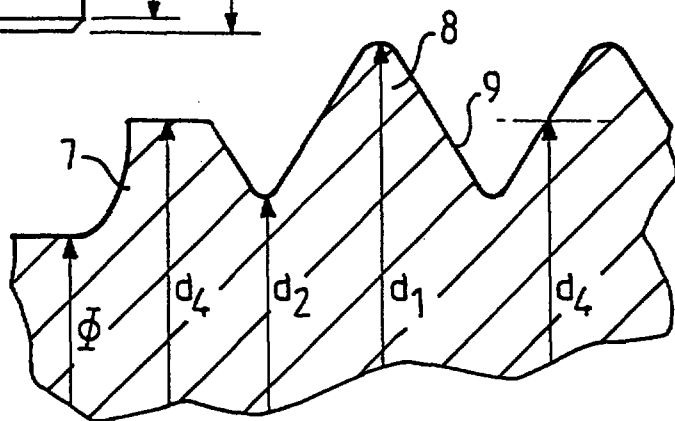
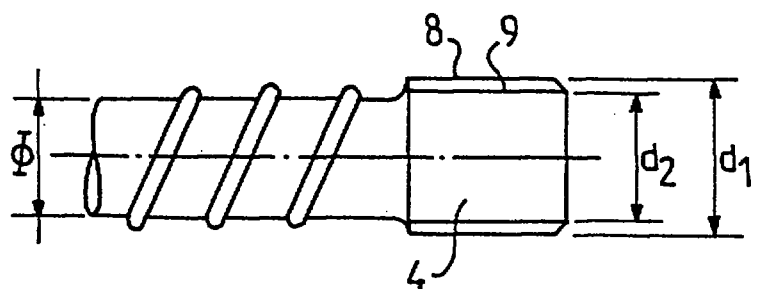
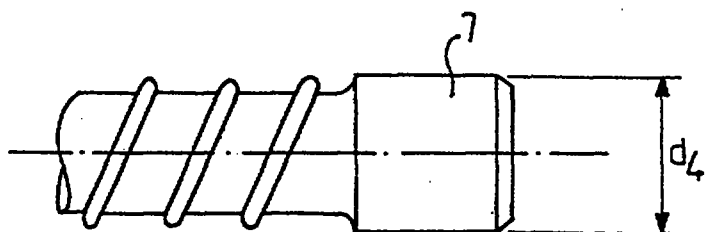
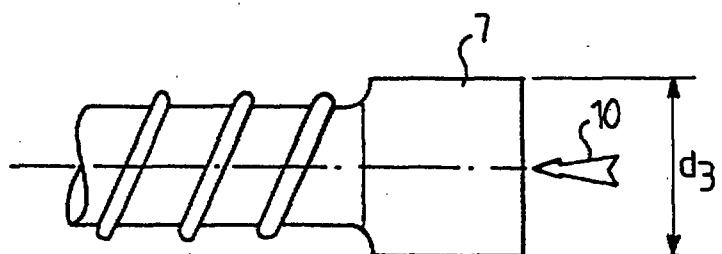
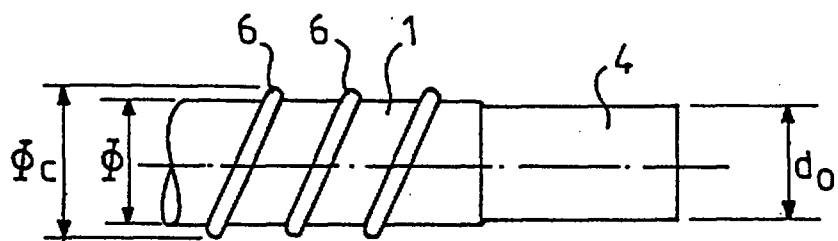
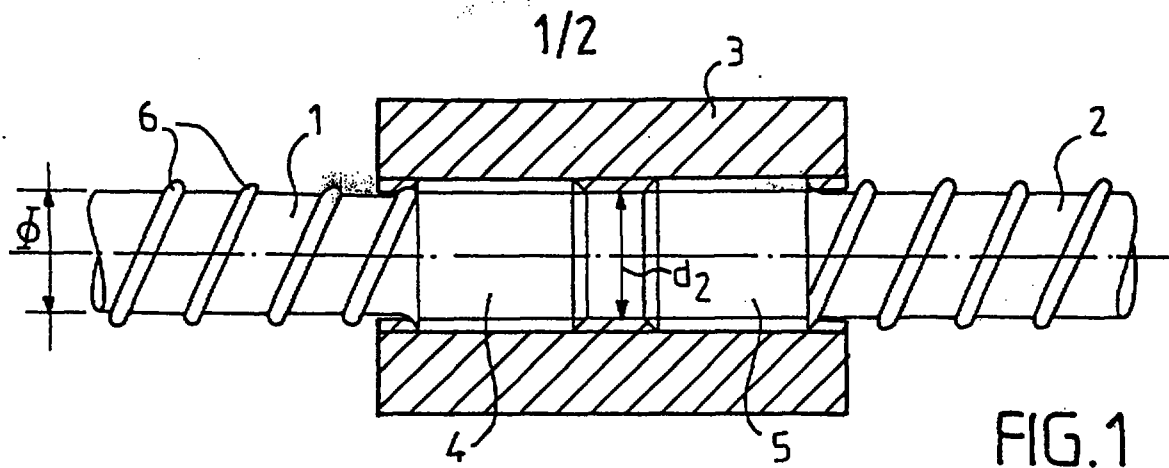
Through the method, at least one round bar for concrete (1) is connected to another round bar for concrete (2), or to an anchorage point, by means of a tapped connection sleeve (3), said round bar for concrete having a nominal section Φ and at least one reinforced end (4), upset and filleted, such that the fillet base diameter d_2 is equal to or greater than the nominal section Φ of the round bar.

According to the invention, the reinforced end (4) is carried out by double upsetting, a first axial upsetting permitting the diameter of the round bar for concrete to increase, a second radial upsetting during filleting by a rolling technique.

Figure 1.

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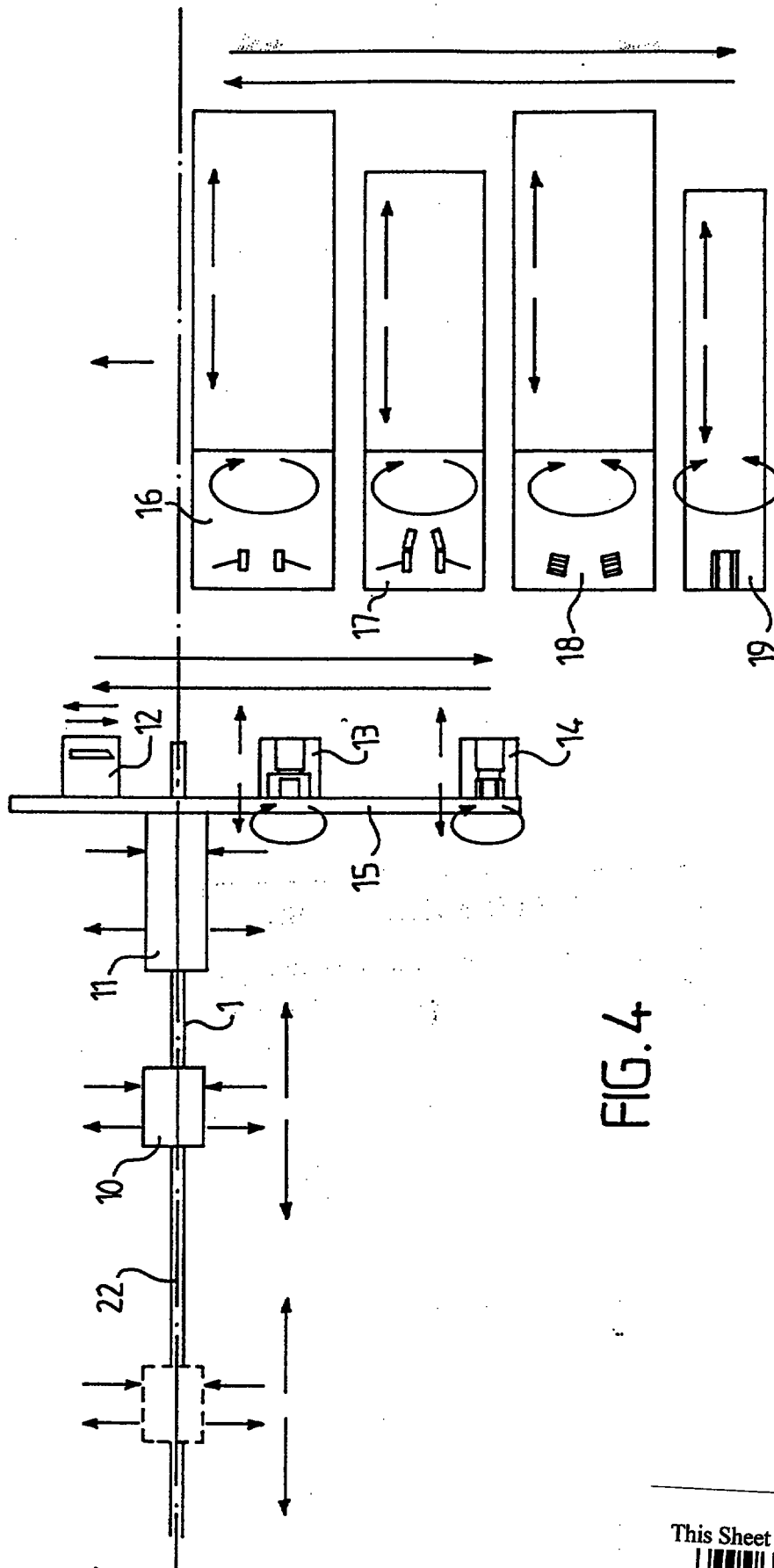


FIG. 4

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METHOD FOR PRODUCING A MECHANICAL CONNECTION FOR ROUNDS OF CONCRETE, CONNECTION OBTAINED BY THE METHOD, ROUND OF CONCRETE PERMITTING THE APPLICATION OF SAID METHOD, AND INSTALLATION FOR PREPARING ROUNDS OF CONCRETE

The invention relates to a method for the creation of a mechanical connection of round bars for concrete, to such a connection obtained by the method, to a round bar for concrete permitting the implementation of said method, and also to an installation for the preparation of round bars for concrete. It will be used in particular in the field of the construction of elements, of buildings or of edifices made of concrete.

In this field, it is customary to use mechanical connections to link round bars for concrete so as to be able to ensure the transmission of tensile stress in a continuous manner.

Nowadays, various solutions are proposed by builders and principally either a setting connection or a fillet connection is used.

In the case of connection by setting, a sleeve is used which is brought to be set on the two ends of the round bars which are to be connected. This technique avoids having to set one of the round bars in rotation, but nevertheless presents high risks of slipping, owing to the setting which is difficult to control. Furthermore, its implementation is often difficult on site because one must be able to intervene with setting tools at the place where the connection is to be carried out.

Increasingly, mechanical connection by filleting is preferred by users. In such a connection, two round bars for concrete are joined, substantially coaxially, by means of a tapped connection sleeve. This solution is likewise applicable when it is necessary to connect a round bar for concrete to an anchorage point.

In addition, to improve the quality of the mechanical connection of round bars for concrete by filleting, a method has been perfected for creating such a connection in which, prior to the filleting, the end of the round concrete bars

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which are to be connected is upset, cold, so as to create a reinforced zone having a diameter greater than the nominal section of the round bar, then the filleting is cut on the said reinforced zone such that the diameter at the base of the fillet is equal to or greater than the nominal section of the round bar for concrete.

Such a method is satisfactory in the majority of constructions and requires a very brief machining. In fact, the end of the round bar for concrete, with its grooves or ribs, is upset, cold, in a matrix then the filleting is carried out on this crude upsetting by cutting.

Although the upsetting is generally limited to a rate of increase in diameter in the order of 30 %, it is nevertheless necessary to use pressures, during upsetting, having a very high value, which are able to extend up to 400, even 500 bars.

In addition, it is to be noted that increasingly concrete edifices are subject to dynamic stresses, and under these conditions the mechanical connections of round bars for concrete are subject to alternate traction-compression effects. Also, the fragility of such connections is increased and it is necessary to anticipate these stresses so that they resist from the point of view of insecurity.

The aim of the present invention is to propose a method for the creation of mechanical connections of round bars for concrete which bring a total security to the connection and which, for the same dimensioning, bear dynamic stresses with an alternate traction-compression effect.

One of the aims of the present invention is to propose a method for the creation of a mechanical connection of round bars for concrete which permits the creation, at the end of the round bar for concrete, of a reinforced zone such that the diameter at the base of the fillet is equal to or greater than the nominal

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section of the round bar for concrete, but which necessitates a cold upsetting of the lesser end, and consequently putting into operation smaller upsetting forces.

Another aim of the present invention is to propose a method for creating a mechanical connection of round bars for concrete which uses a very high quality filleting with good tolerances which does not reduce the resistance of the end.

In particular, the filleting is carried out by rolling, which avoids cutting the fibres of the bar and causing incipient fractures in the case of dynamic stresses.

Another aim of the present invention is to propose a mechanical connection of round bars for concrete and also a round bar for concrete permitting the implementation of the method of the present invention.

In addition, another aim of the present invention is to propose an installation for the preparation of such round bars for concrete which is economical, entails a reasonable investment and is of reduced dimensions, given the forces which are used.

Other aims and advantages of the present invention will become apparent in the course of the following description which is only given, however, by way of an indication and which does not aim to limit the invention.

According to the invention, the method for creating a mechanical connection of round bars for concrete, which will be used in particular in the field of construction in concrete, by which at least one round bar for concrete is connected to another round bar for concrete or to an anchorage point, by means of a tapped connection sleeve, said round bar for concrete having a nominal section Φ , at least one reinforced end, upset and filleted, such that the

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diameter of the base of the fillet is equal to or greater than the nominal section Φ of the round bar, is characterised in that the reinforced end is effected by double upsetting, a first axial upsetting allowing the diameter of the round bar for concrete to increase, and a second radial upsetting when filleting is carried out by the rolling technique.

The method of the invention allows a mechanical connection of a round bar for concrete to an anchorage point to be produced, or a mechanical connection of two round bars for concrete end to end substantially coaxially.

In addition, the round bar for concrete permitting the method of the invention to be implemented is characterised in that at least one of its ends has a double upsetting such that the diameter of the base of the fillet is greater than or equal to the nominal section of the round bar for concrete.

The installation for preparing round bars for concrete according to the invention is as regards itself characterised in that it has:

- a) means for immobilising the round bar for concrete which is to be prepared,
 - b) means for the cold upsetting axially of the end of the round bar for concrete,
 - c) means for removing the surface from the extent which is to be upset and/or filleted,
 - d) means for carrying out a filleting by rolling of the said end,
- said means b), c), d) being movable so as to be placed coaxially in the axis of the round bar for concrete which is locked in the means a).

The present invention will be understood better on reading the following description accompanied by drawings which form an integral part thereof.

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Figure 1 shows a mechanical connection of a round bar for concrete according to the method of the present invention.

Figures 2a to 2d show the different stages in the method for creating the mechanical connection of a round bar for concrete according to the invention, and more precisely the working of the end of the round bar for concrete carried out in the method.

Figure 3 shows a sectional view, on an enlarged scale, showing the dimensional characteristics of the end of the round bar for concrete of Figure 2d.

Figure 4 shows diagrammatically the arrangement of the various means constituting the installation for preparing the round bar for concrete according to the present invention.

The invention aims at a method for creating a mechanical connection of a round bar for concrete, a connection thus obtained and also a round bar for concrete permitting said method to be implemented, and an installation for preparing such round bars.

It will be used in particular in the field of construction in concrete.

Figure 1 shows an example embodiment of a mechanical connection permitting the connection to be ensured of two round bars for concrete 1 and 2, end to end, substantially coaxially. In addition, this connection uses a tapped connection sleeve 3, suited to receiving respectively on one side the filleted end 4 of the first round bar for concrete 1 and on the other side the end 5 of the second round bar for concrete 2.

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Each of the round bars for concrete is determined by calculation then selected from a standardized or regulated range. The characteristic of a round bar for concrete lies essentially in an imposition of weight and section, these being rolled taking into account these requirements.

Generally, the round bar for concrete has on its external surface grooves or ribs 6 which create protuberances permitting the round bar to be immobilised in translation in the concrete when it is embedded in the latter.

Under these conditions, the round bar has on the one hand a nominal section characterised by Φ which is, as it were, the section of the core of the round bar, and a diameter on the grooves or ribs marked Φ_c as illustrated in particular by Figure 2a.

According to the method of the present invention, each round bar for concrete 1, 2 which is to be connected has at least one reinforced end 4, 5, which is upset and filleted such that the diameter of the base of the fillet d_2 is equal to or greater than the nominal section Φ of the round bar. This is illustrated particularly in Figures 2d and 3.

More precisely, according to the method, the reinforced end 4, 5 is effected by double upsetting, a first axial upsetting 7 permitting the diameter of the round bar for concrete to be increased, and a second radial upsetting 8 during filleting by a rolling technique.

The first axial upsetting 7 is carried out prior to the filleting, and cold upsetting is carried out on the end of the round bar for concrete 1, 2 which is to be connected, so as to create a reinforced zone 7 corresponding at least substantially to the diameter d_4 of the fillet sides.

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Then the second radial upsetting 8 is carried out, creating a filleting 9 on the said reinforced zone 7 by rolling so that the diameter at the base of the fillet d_2 is equal to or greater than the nominal section Φ of the round bar.

This being so, in a general manner, the upsettings 7, 8 are carried out on the length of the filleting 9 of the said end 4, 5.

The different stages of the method are illustrated in Figures 2a to 2d.

In Figure 2a, a first removal of the surface of the end of the round bar to be reinforced is shown, to rid it of its grooves or ribs and to give this end an acceptable cylindrical form. This surface removal is marked by the diameter d_0 close to or very slightly less than the diameter Φ .

On this end 4 which has been prepared in this way, one proceeds with the first upsetting 7 at a rate of increase of the diameter of the end close to 15 to 20 %. This stage brings the diameter d_0 to a greater diameter d_3 , which is itself greater than diameter Φ of the round bar. This cold upsetting is realised by carrying out an axial pressure on the end in accordance with the arrow 10.

Then, as shown by Figure 2c, the upset extent 7 is adjusted, in particular to calibrate it, to the diameter d_4 which will allow the desired filleting to be carried out by rolling.

According to the rolling technique, this diameter d_4 corresponds to the diameter of the fillet sides shown in Figure 3. During rolling, the metal will then be pushed back to constitute the base of the fillet d_2 and will be upset to constitute the exterior part of the filleting d_1 .

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Under these conditions, one arrives at the end as marked in Figure 2d in which the latter, after a double axial upsetting 7 and radial upsetting 8, shows a reinforced end such that the diameter at the base of the fillet d_2 is equal to or greater than the nominal section Φ of the round bar.

In addition, to resist the traction test which is imposed by certain safety standards, the end 4 and/or 5 of the round bar for concrete 1 and/or 2, reinforced by upsetting, is pre-stressed.

This pre-stressing allows all the displacements and elongations of the round bars for concrete to be cancelled and in particular of their ends when safety tests are carried out. It is carried out after the filleting, mechanically by compression of the said filleted end.

The method which has just been described permits the realisation of a mechanical connection of two round bars for concrete end to end, substantially coaxially. However, this method can be adapted to obtain a mechanical connection of a round bar for concrete to an anchorage point.

In this case, the sleeve will be adapted to receive a single round bar, but will have an exterior configuration in the form of an anchorage socket.

This being the case, by way of example, in a round bar for concrete HA20 of nominal section 20 mm, a filleting M24 of tolerance 6g is made on its end.

After a removal of the surface of the end of the round bar, the axial upsetting was carried out to obtain a diameter d_3 of 23 mm.

Then a rolling of the end thus upset was carried out to bring the diameter d_4 to be comprised between 21.803 and 22.003 mm.

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On this calibrated end, the filleting M24 was carried out at a pitch of 3 by rolling. The exterior diameter d_1 is therefore comprised between 23.577 and 23.952 mm and the diameter of the base of the fillet d_2 therefore corresponds to 20.704 mm, namely greater than the 20 mm of the nominal section of the round bar HA20.

Likewise, starting from a round bar for concrete HA of 20 mm, to obtain a diameter M24 at a pitch of two, taking into account the standardisation of the filletings, one must start from a basic diameter equal to the diameter at the sides of the fillet placed between 22.493 and 22.603 mm.

With respect to the previous solution in which a cold upsetting was carried out in a single stage on the end of the round bar for concrete and then the filleting was cut, a great gain is to be noted, because the upset mass which is necessary is much less.

Previously, an exterior upsetting had to be obtained in the order of 27 mm, namely a displacement of mass in the order to 50 g and a length of 20 mm.

According to the present invention, the necessary axial upsetting brings about a displacement of a mass of 18 g or a length of 8 mm. The axial upsetting is therefore reduced from 50 to 18 g, namely a reduced ratio of 2.8.

In addition, the quality of the filleting allows the 8g tolerance to be abandoned and allows 5 or 6 g tolerances to be used.

Figure 4 shows diagrammatically an installation for the preparation of round bars for concrete to allow the implementation of the method of the present invention.

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The installation firstly comprises a feeding zone of the round bar for concrete which is to be prepared. In this zone a vice 10 is provided, which will be able to grip the round bar for concrete 1 and move it towards the installation.

Following this zone, means 11 are provided for immobilising the round bar which is to be prepared. These means are, for example, constituted by a vice 11 having a great length, in particular provided with a covering of the natural rubber or polyurethane type to avoid damage to the round bars for concrete.

The advantage of offering a great length for the vice allows one to have a large area at one's disposal and a relative weakness of compression per square metre.

The vices 10 and 11 are of the hydraulic type, displaceable horizontally in relation to the longitudinal axis 22 for feeding the round bars for concrete.

The various arrows in Figure 4 simulate the functioning of the system and in particular the following functioning: the vice 10 grips the round bar for concrete, the immobilisation vice 11 opens, the vice 10 moves forward, the vice 11 grips around the round bar, the vice 10 releases itself and moves back to prepare a new cycle.

In front of the immobilisation vice 11 there will be provided in sliding arrangement: a cutter 12, means 13 for the cold upsetting axially of the end of the round bars, and also a unit for mechanical stress by compression of the filleted end of the round bar.

This will be possible in particular by providing slides 15 in front of the vice so as to permit a vertical displacement of the three tools 12-14 as suggested by the figures, to be placed coaxially in the axis 22 of the locked round bar at 11.

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Under these conditions, the round bar for concrete will be able to be worked without having to alter its positioning, this being locked once and for all in the vice 11.

Likewise, the installation will offer means 16, 17 for removing the surface from the extent which is to be upset and/or filleted. These means will be provided with vertical and horizontal displacement so as to be able to bring the surface removal tool in the longitudinal axis 22 of the round bar for concrete which is to be worked.

In addition, the installation will comprise, in the same sense, means 18 to create a filleting by rolling, i.e. the unit 18 will be suited to being displaced so as to be placed coaxially in the axis 22 locked in the means 11.

Finally, the installation will likewise offer a unit 19 for screwing and unscrewing a sleeve, permitting the utilisation of the said stress in the tool 14.

The main advantage of the installation of the present invention lies in that all the operations are carried out without having to move the round bar for concrete or having to reposition it and thus avoid all the positioning and centering operations which would be obligatory in order to carry out the various machining stages.

Thus, on the round bar for concrete and more precisely on the ends thereof, a reinforcement will be able to be carried out by double upsetting, a first axial upsetting by the means 13 for cold upsetting, and a second radial upsetting during filleting by the rolling tool 18. This manner of procedure allows the cold upsetting pressures to be reduced, allows the cold upsetting to be facilitated by working on a machined diameter, allows the hardened surface to be eliminated,

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i.e. the skin of the round bar for concrete, and its ribs, due to the surface removal.

Of course, other forms of embodiment of the present invention, within the scope of the specialist in the art, could have been envisaged without, however, departing from the framework of the present application.

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Claims

1. A method for the creation of a mechanical connection of round bars for concrete, which will be used in particular in the field of construction in concrete, by which at least one round bar for concrete (1) is connected to another round bar for concrete (2), or to an anchorage point, by means of a tapped connection sleeve (3), said round bar for concrete (1) having a nominal section Φ , and at least one reinforced end (4), upset and filleted, such that the diameter at the base of the fillet d_2 is equal to or greater than the nominal section Φ of the round bar, characterised in that the reinforced end (4) is effected by double upsetting, a first axial upsetting (7) allowing the diameter of the round bar for concrete to increase, and a second radial upsetting (8) when filleting is carried out by a rolling technique.

2. A method according to Claim 1, characterised in that:

- prior to filleting, the end (4) of the round bar for concrete which is to be connected undergoes a cold upsetting so as to create a reinforced zone having a diameter corresponding at least substantially to the fillet sides diameter d_4 ,
- a filleting (9) is carried out on said reinforced zone (7) by rolling so that the diameter at the base of the thread d_2 is equal to or greater than said nominal section Φ .

3. A method according to Claim 1, characterised in that the upsettings (7, 8) are carried out over the length of the filleting of the said end (4).

4. A method according to Claim 1, characterised in that the first upsetting (7) is carried out at a rate of increase of the diameter of the end which is close to 15 %.

5. A method according to Claim 1, characterised in that after the filleting of

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the said upset end, the said filleted end is stressed mechanically by compression.

6. A method according to Claim 2, characterised in that:

- the end of the crude round bar has its surface removed to take off the exterior ribs,
- a cold upsetting is carried out, creating an axial thrust on the end so as to obtain a diameter close to the fillet sides diameter d_4 ,
- the upset extent is adjusted to calibrate it and to carry out the desired filleting by rolling.

7. A mechanical connection of a round bar for concrete to an anchorage point, obtained by implementing the method according to any one of Claims 1 to 6.

8. A mechanical connection of round bars for concrete end to end substantially coaxially obtained by implementing the method according to any one of Claims 1 to 6.

9. A round bar for concrete permitting the implementation of the method according to any one of Claims 1 to 6, characterised in that at least one of its ends (4) carries a double upsetting (7, 8) such that the fillet base diameter d_2 is greater than or equal to the nominal section of the round bar for concrete Φ .

10. An installation for the preparation of round bars for concrete to permit the implementation of the method according to any one of Claims 1 to 6, characterised in that it has:

- a) means (11) for immobilising the round bar (1) which is to be prepared,
- b) means (13) for the cold upsetting axially of the end (4) of the round bar for concrete,
- c) means (16, 17) for removing the surface from the extent which is to be

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upset and/or filleted,

d) means (18) for carrying out a filleting by rolling of the said end, said means b), c), d) being movable so as to be placed coaxially in the axis (22) of the round bar for concrete which is locked in the immobilisation means (11).

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METHOD FOR PRODUCING A MECHANICAL CONNECTION FOR ROUNDS OF CONCRETE, CONNECTION OBTAINED BY THE METHOD, ROUND OF CONCRETE PERMITTING THE APPLICATION OF SAID METHOD, AND INSTALLATION FOR PREPARING ROUNDS OF CONCRETE

Abstract

The invention relates to a method for the creation of a mechanical connection of round bars for concrete and also to such a mechanical connection and to a round bar for concrete permitting the method to be implemented, and to an installation for the preparation of round bars for concrete.

It will be used in the field of construction in concrete.

Through the method, at least one round bar for concrete (1) is connected to another round bar for concrete (2), or to an anchorage point, by means of a tapped connection sleeve (3), said round bar for concrete having a nominal section Φ and at least one reinforced end (4), upset and filleted, such that the fillet base diameter d_2 is equal to or greater than the nominal section Φ of the round bar.

According to the invention, the reinforced end (4) is carried out by double upsetting, a first axial upsetting permitting the diameter of the round bar for concrete to increase, a second radial upsetting during filleting by a rolling technique.

Figure 1.

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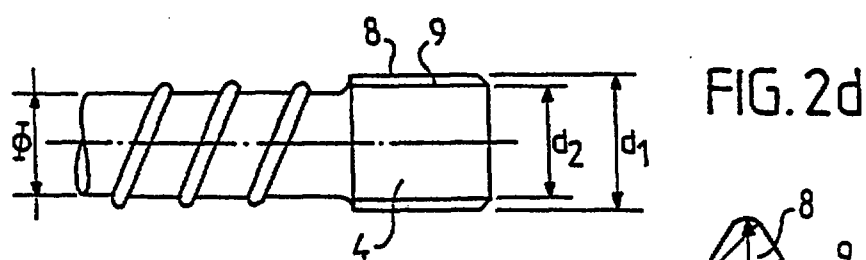
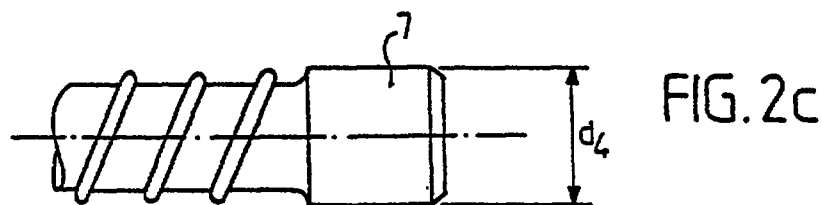
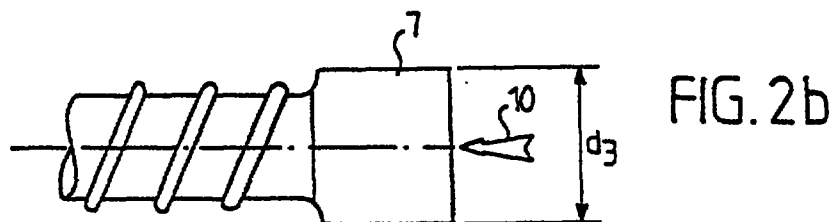
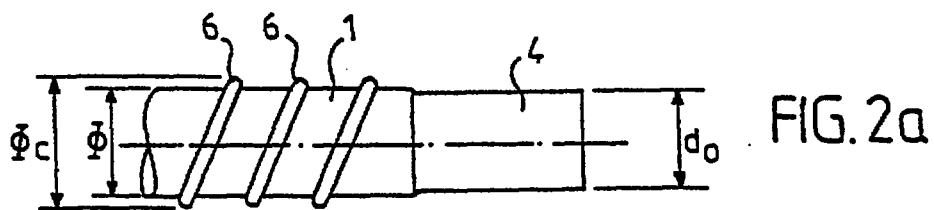
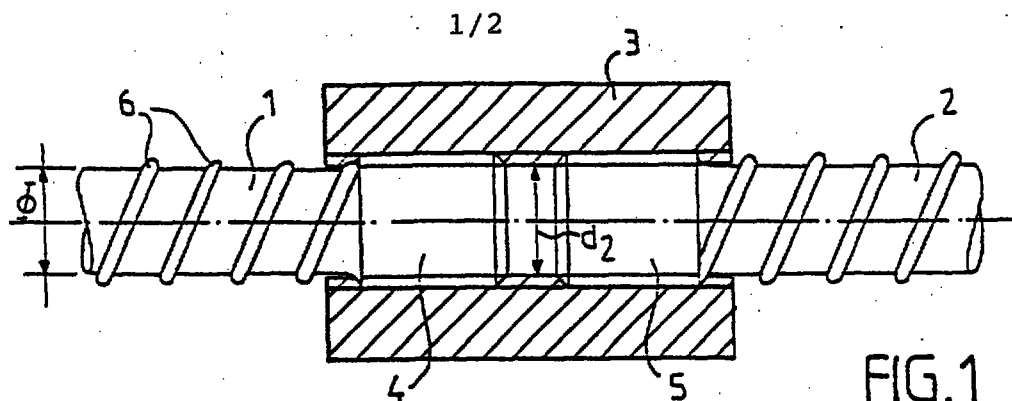
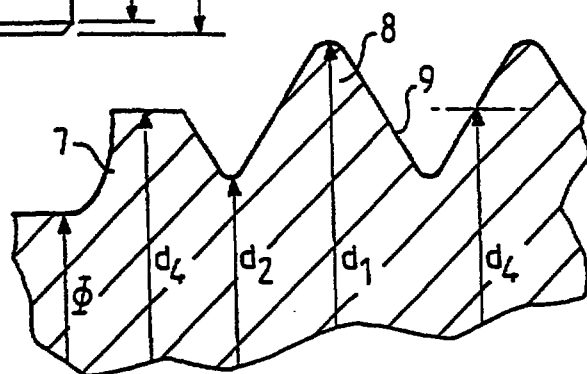


FIG. 3



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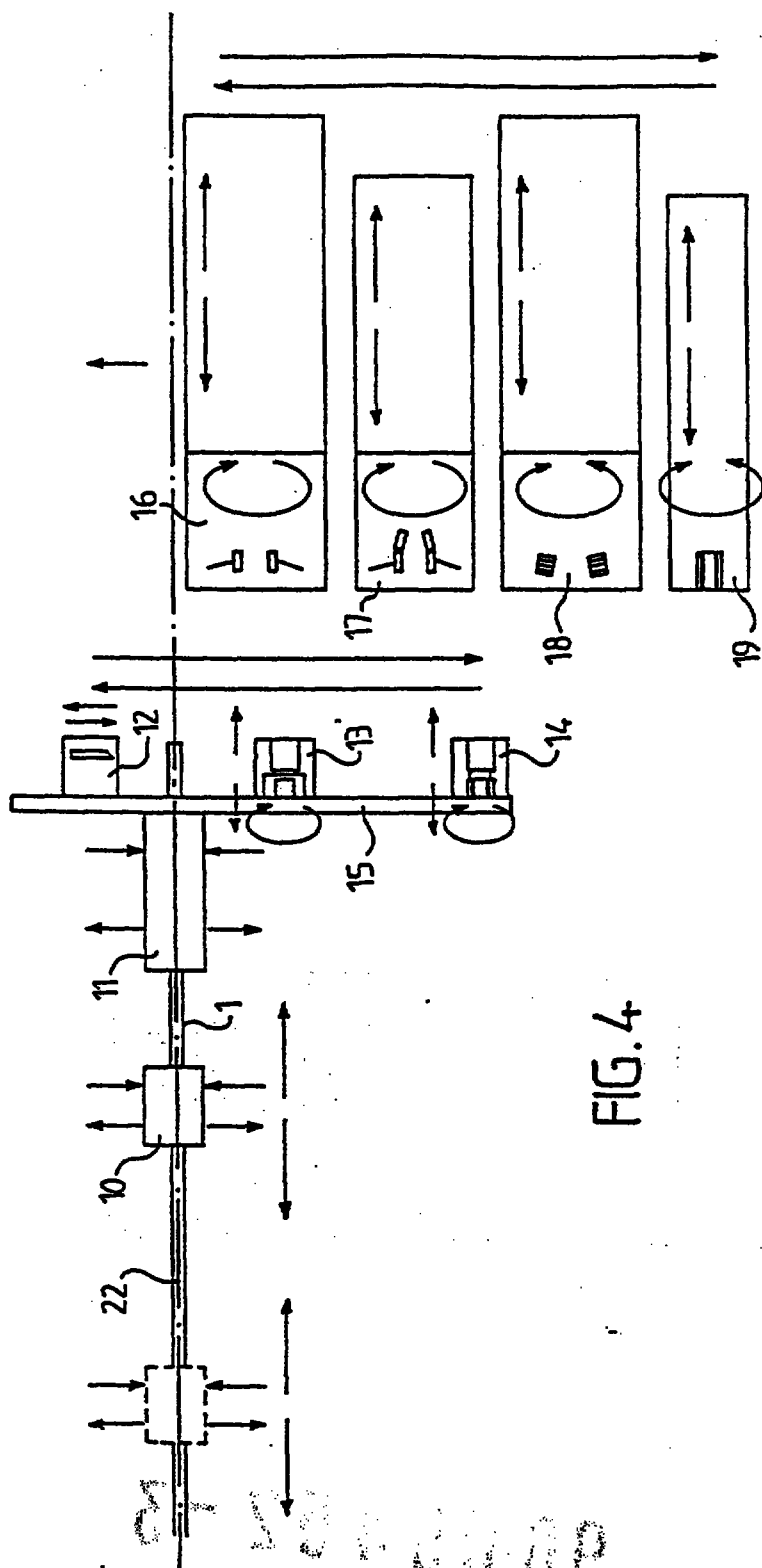


FIG. 4

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METHOD FOR PRODUCING A MECHANICAL CONNECTION FOR
ROUNDS OF CONCRETE, CONNECTION OBTAINED BY THE METHOD, ROUND
OF CONCRETE PERMITTING THE APPLICATION OF SAID METHOD, AND
INSTALLATION FOR PREPARING ROUNDS OF CONCRETE

The invention relates to a method for producing a mechanical connection of reinforced-concrete rounds, and an installation for preparing reinforced-concrete rounds. It will find its application notably in the field of the construction of concrete elements, buildings, or edifices.

In this field, it is normal to use mechanical connections for connecting reinforced-concrete rounds in order to be able to provide the transmission of the traction force in a continuous fashion.

At the present time, different solutions are proposed by manufacturers, and in the main use is made either of a connection with crimping, or a threaded connection.

In the case of connection by crimping, a sleeve is used which is crimped onto the two ends of the rounds to be connected. This technique avoids having to rotate one of the rounds but nevertheless has high risks of slipping, because of the crimping, which is difficult to control. In addition, its implementation is often difficult on a site since it is necessary to be able to work with a crimping tool, at the place where the connection is to be made.

Increasingly, mechanical connection using a thread is preferred by users. In such a connection, two reinforced-concrete rounds are connected, substantially coaxially, by means of a threaded connection sleeve. This solution can also be applied when it is necessary to connect a reinforced-concrete round to an anchoring point.

In addition, in order to improve the quality of the mechanical connection of reinforced-concrete rounds by threading, a method has been developed for producing such a connection in which, prior to the threading, the end of the reinforced-concrete rounds to be connected are cold-rammed, in order to produce a strengthened area with a diameter greater than the nominal cross section of the round, and then the thread is cut over the said reinforced area so that the thread root diameter is equal to or greater than the nominal cross section of the reinforced-concrete round.

Such a method gives satisfaction in the majority of constructions and requires very brief working. This is because the end of the reinforced-concrete round, with its ridges or ribs, is cold-rammed in a die, and then the thread is produced on this unworked rammed area by milling.

Although the ramming is generally limited to a rate of increase in the diameter of around 30%, it is nevertheless necessary to use pressures of very high value during the ramming which may be as much as 400 or even 500 bars.

In addition, it should be noted that, increasingly, concrete

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edifices are subject to dynamic forces, and under these conditions the mechanical connections of reinforced-concrete rounds are subjected to alternating traction/compression effects. The fragility of such connections is therefore increased and it is necessary to predict these stresses so that they withstand with regard to insecurity.

The document EP-A-0 327 770 describes a method according to which at least one reinforced-concrete round is connected to another reinforced-concrete round, or to an anchoring point, by means of a threaded connecting sleeve, the said reinforced-concrete round having a nominal cross section Φ , and at least one reinforced end, consisting of cold-ramming the end of the reinforced-concrete round to be connected in order to produce a strengthened area, and producing a thread on the said strengthened area so that the thread-root diameter d_2 is equal to or greater than the said nominal cross section Φ .

The document EP-B-1 659 264 describes a method for connecting reinforced-concrete rounds, by means of a threaded sleeve, according to which the ribs on the ends of the bars are removed, before producing a thread.

The document FR-A-2 653 809 describes an installation for producing reinforced-concrete rounds including means for immobilising the round to be prepared, means for axially cold-ramming one end of the reinforced-concrete round and means for threading this end.

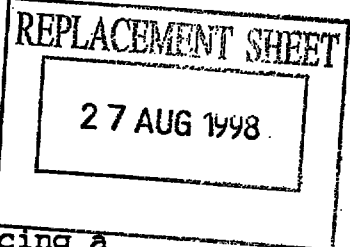
The aim of the present invention is to propose a method for producing mechanical connections for reinforced-concrete rounds which afford total security at the connection and which, for the same size, withstand dynamic stresses with an alternating traction/compression effect.

One of the aims of the present invention is to propose a method for producing a mechanical connection for reinforced-concrete rounds which makes it possible to produce, at the end of the reinforced-concrete round, a strengthened area such that the thread-root diameter is equal to or greater than the nominal cross section of the reinforced-concrete round, but which requires cold-ramming of the smaller end, and consequently using smaller ramming forces.

Another aim of the present invention is to propose a method for producing a mechanical connection for reinforced-concrete rounds which uses a thread of very good quality with good tolerances which does not reduce the strength of the end.

In particular, the thread is produced by rolling, which avoids cutting the fibres of the bar and causing incipient fractures during dynamic forces.

Another aim of the present invention is to propose an installation for preparing such reinforced-concrete rounds which is economical, requires reasonable investment and is of



reduced size given the forces used.

According to the invention, the method for producing a mechanical connection of reinforced-concrete rounds, according to which at least one reinforced concrete round is connected to another concrete round, or to an anchoring point, by means of a threaded connecting sleeve, the said reinforced-concrete round having a nominal cross section Φ , and at least one reinforced end, consisting of cold-ramming the end of the reinforced-concrete round to be connected in order to produce a strengthened area, and producing a thread on the said strengthened area so that the thread-root diameter d_2 is equal to or greater than the said nominal cross section Φ , is characterised in that it consists of:

- skimming the end of the unworked round in order to remove the external ribs,
- effecting a cold ramming by exerting an axial thrust on this end in order to obtain a diameter close to the thread pitch diameter d_4 ,
- dressing the rammed length in order to calibrate it, and
- producing the thread by means of a radial ramming using a rolling technique.

The method of the invention results in a mechanical connection of a reinforced-concrete round to an anchoring point or a mechanical connection of two reinforced-concrete rounds end-to-end and substantially coaxially.

The installation for preparing reinforced-concrete rounds according to the invention is for its part characterised by the fact that it includes means for skimming the surface to be rammed and/or threaded, means for producing a thread by rolling the said end, the said means for skimming, cold-ramming and producing a thread being movable so as to be positioned in succession coaxially in line with the reinforced-concrete round locked in the immobilisation means.

The invention will be better understood from a reading of the following description accompanied by the drawings which form an integral part thereof.

Figure 1 shows a mechanical connection of reinforced-concrete rounds produced according to the method of the present invention.

Figures 2a to 2d show the different steps of the method for producing the mechanical connection of reinforced-concrete rounds according to the invention, and more precisely the working of the end of the reinforced-concrete round used in the method.

Figure 3 shows an enlarged view in cross section showing the

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dimensional characteristics of the end of the reinforced-concrete round of Figure 2d.

Figure 4 shows schematically the arrangement of the various means constituting the installation for preparing the reinforced-concrete round according to the present invention.

Figure 1 shows an example embodiment of a mechanical connection for providing the connection of two reinforced-concrete rounds 1 and 2, end-to-end and substantially coaxially. Moreover, this connection uses a threaded connecting sleeve 3, suitable for receiving respectively on the one hand the threaded end 4 of the first reinforced-concrete round 1 and on the other hand the end 5 of the second reinforced-concrete round 2.

Each of the reinforced-concrete rounds is determined by calculation and then chosen from a standardised or controlled range. The characteristic of a reinforced-concrete round lies essentially in an imposition of weight and cross section, these being rolled having regard to these requirements.

In general terms, the reinforced-concrete round has on its external face ridges or ribs 6 which create protuberances for immobilising the round with respect to translation in the concrete when it is embedded in the latter.

Under these conditions, the round has on the one hand a nominal cross section characterised by Φ , which is as it were the cross section of the core of the round, and a diameter over the ridges or ribs marked Φ_c , as illustrated in particular in Figure 2a.

According to the method of the present invention, each reinforced-concrete round to be connected 1, 2 has at least one reinforced end 4, 5, rammed and threaded, such that the thread-root diameter is equal to or greater than the nominal cross section Φ of the round. This is illustrated in particular in Figures 2d and 3.

More precisely, according to the method, the reinforced end 4, 5 is produced by double ramming, a first axial one 7, enabling the diameter of the reinforced-concrete round to be increased, and a second radial one 8 during the threading by means of a rolling technique.

The first axial ramming 7 is effected prior to the threading, and the end of the reinforced-concrete round 1, 2 to be connected is cold-rammed in order to produce a strengthened area 7 corresponding at least substantially to the thread-flank diameter d_4 .

Then the second radial ramming 8 is effected by producing a thread 9 on the said strengthened area 7 by rolling so that the thread-root diameter d_2 is equal to or greater than the nominal cross section Φ of the round.

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This being the case, in general terms, the ramblings 7, 8 are effected over the length of the thread 9 of the said end 4, 5.

The different steps of the method are illustrated in Figures 2a to 2d.

In Figure 2a, a first skimming of the end of the round to be reinforced is shown, for ridding it of its ridges or ribs and for giving this end an acceptable cylindricity. This skimming is registered by the diameter d_0 close to or very slightly less than the diameter ϕ .

On this end 4 thus prepared, the first ramming 7 is carried out at a rate of increase of the diameter of the end of around 15 to 20%. This step takes the diameter d_0 to a greater diameter d_3 , itself greater than the diameter ϕ of the round. This cold-ramming is carried out by producing an axial thrust on the end in the direction of the arrow 10.

Then, as shown in Figure 2c, the rammed length 7 is dressed, notably in order to calibrate it, to the diameter d_4 which will make it possible to produce the desired thread by rolling.

According to the rolling technique, this diameter d_4 corresponds to the thread-flank diameter shown in Figure 3. During rolling, the metal will then be pushed back in order to constitute the thread root d_2 , and will be rammed to form the outer part of the thread d_1 .

Under these conditions, the end as marked in Figure 2d is produced, in which it, after a double ramming, axial 7 and radial 8, exhibits a reinforced end such that the thread-root diameter d_2 is equal to or greater than the nominal cross section ϕ of the round.

Moreover, in order to withstand the traction test imposed by certain safety standards, the end 4 and/or 5 of the reinforced-concrete round 1 and/or 2 strengthened by ramming, is prestressed.

This prestressing prevents all movements and elongations of the reinforced-concrete rounds and notably of their ends during the safety tests implemented. It is effected subsequently to threading, mechanically by compression of the said threaded end.

The method which has just been described makes it possible to effect a mechanical connection of two reinforced-concrete rounds end-to-end and substantially coaxially. However, this method can be adapted to obtain a mechanical connection of a reinforced-concrete round to an anchoring point.

In this case, the sleeve will be adapted to receive a single round but will have an external configuration in the form of an anchoring bush.

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This being the case, by way of example, in the case of an HA20 (High Adherence with a nominal diameter of 20 mm) reinforced concrete round, an M24 (ISO 261) thread with tolerance 6 g (ISO 965/1) is formed on its end.

After skimming the end of the round, axially ramming was carried out to obtain a diameter d3 of 23 mm.

Then a cylindrical turning of the end thus rammed was carried out in order to take the diameter d4 to between 21.803 and 22.003 mm.

On this calibrated end, the M24 thread with a pitch of 3 was produced by rolling. The outside diameter d1 then being between 23.577 and 23.952 mm, and the thread-root diameter d2 then corresponding to 20.704 mm, that is to say greater than the 20 mm of the nominal cross section of the HA20 round.

Likewise, starting from an HA reinforced-concrete round of 20 mm, to obtain a diameter M24 with a pitch of 2, having regard to the standardisation of threads, it is necessary to start from a primitive diameter equal to the thread-flank diameter situated between 22.493 and 22.603 mm.

Compared with the prior solution in which the end of the reinforced-concrete round was cold-rammed in a single step and then the thread was milled, a significant gain should be noted since the rammed weight required is much less.

Previously, it was necessary to obtain an external ramming of around 27 mm, that is to say a weight movement of around 50 g and a length of 20 mm.

According to the present invention, the axial ramming required gives rise to the movement of a weight of 18 g or a length of 8 mm. The axial ramming is therefore reduced from 50 to 18 g, that is to say a reduced ratio of 2.8.

In addition, the quality of the thread makes it possible to abandon the 8 g tolerance and to use tolerances of 5 to 6 g.

Figure 4 shows schematically an installation for preparing reinforced-concrete rounds for allowing the implementation of the method of the present invention.

The installation includes first of all an area for feeding the reinforced-concrete round to be prepared. In this area a vice 10 is provided, which will be able to grip the reinforced-concrete round 1 and move it towards the installation.

Following this area, means 11 for immobilising the round to be prepared are provided. These means consist for example of a long vice 11, notably lined with a covering of the natural rubber or polyurethane type in order to prevent damage to the reinforced-concrete rounds.

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The advantage of having a great length of vice makes it possible to have a large surface area and relatively low compression per square metre.

The vices 10 and 11 are of the hydraulic type and can be moved horizontally with respect to the longitudinal feed axis 22 of the reinforced concrete rounds.

The different arrows in Figure 4 simulate the functioning of the system and notably the following functioning: the vice 10 grips the reinforced-concrete round, the immobilisation vice 11 opens, the vice 10 moves forward, the vice 11 closes on the round again, the vice 10 releases and withdraws in order to prepare for a new cycle.

In front of the immobilisation vice 11 there are slidably provided a cropping tool 12, means 13 for axially cold-ramming the end of the rounds, and a unit for mechanically stressing the threaded end of the round by compression.

This is notably possible by providing runners 15 in front of the vice in order to allow a vertical movement of the three tools 12-14 as suggested by the figures, so as to be positioned coaxially in the axis 22 of the round locked at 11.

Under these circumstances, it is possible to work the reinforced-concrete round without having to modify its positioning, it being locked once and for all in the vice 11.

Likewise, the installation has means 16, 17 for skimming the length to be rammed and/or threaded. These means are designed to move vertically and horizontally in order to bring the skimming tool into the longitudinal axis 22 of the reinforced-concrete round to be worked.

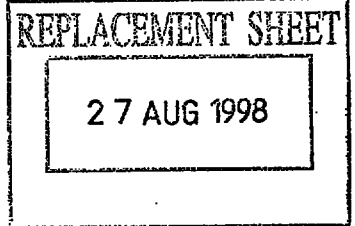
Moreover, the installation has, along the same lines, means 18 for producing a thread by rolling, that is to say the unit 18 is suitable for being moved so as to be positioned coaxially in the axis 22 locked in the means 11.

Finally, the installation also has a unit 19 for screwing and unscrewing a sleeve for implementing the said stress in the tool 14.

The main advantage of the installation of the present invention lies in the fact that all the operations are carried out without having to move the reinforced-concrete round nor to reposition it and thus avoid all the positionings and centrings which would be necessary to carry out the different production steps.

Thus it is possible to produce on the reinforced-concrete round, and more precisely on the ends, a strengthening by double ramming, a first axial one by the cold-ramming means 13, and a second radial one during the threading by means of the rolling tool 18. This way of proceeding makes it possible

to reduce the cold-ramming pressures, to facilitate the cold-ramming by working on a worked diameter, to eliminate the hardened surface, that is to say the skin on the reinforced-concrete round, and its ribs by virtue of the skimming.



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CLAIMS

1. Method for producing a mechanical connection of reinforced-concrete rounds having external ribs, which notably finds an application in the field of concrete construction, wherein at least one reinforced-concrete round (1) is connected to another reinforced-concrete round (2), or to an anchoring point, by means of a threaded connecting sleeve (3), the said reinforced-concrete round (1) having a nominal cross section Φ , and at least one reinforced end (4), consisting of cold-ramming the end (4) of the reinforced concrete round to be connected in order to produce a strengthened area, and producing a thread (9) on the said strengthened area (7) so that the thread-root diameter d_2 is equal to or greater than the said nominal cross section Φ , characterised in that it consists of:

- skimming the end of the unworked round in order to remove the external ribs (6),
- effecting a cold ramming by exerting an axial thrust on this end in order to obtain a diameter close to the thread pitch diameter d_4 ,
- dressing the rammed length in order to calibrate it, and
- producing the thread by means of a radial ramming (8) using a rolling technique.

2. Method according to Claim 1, characterised by the fact that the rammings (7, 8) are effected over the thread length of the said end (4).

3. Method according to Claim 1, characterised by the fact that the first ramming (7) is carried out at a rate of increase of the diameter of the end of around 15%.

4. Method according to Claim 1, characterised by the fact that, subsequent to the threading of the said rammed end, the said threaded end is stressed mechanically by compression.

5. Installation for preparing reinforced-concrete rounds to allow the implementation of the method according to any one of Claims 1 to 4, including means (11) for immobilising the round (1) to be prepared, means (13) for cold-ramming axially one end of the reinforced-concrete round and means (18) for threading this end, characterised in that it includes means (16, 17) for skimming the length to be rammed and/or to be threaded, means (18) for producing a thread by rolling the said end, the said means for skimming, cold-ramming and producing a thread being movable in order to be placed in succession coaxially in the axis (22) of the reinforced-concrete round locked in the immobilisation means (11).



* C L M S *

METHOD FOR PRODUCING A MECHANICAL CONNECTION FOR ROUNDS OF CONCRETE, CONNECTION OBTAINED BY THE METHOD, ROUND OF CONCRETE PERMITTING THE APPLICATION OF SAID METHOD, AND INSTALLATION FOR PREPARING ROUNDS OF CONCRETE

Abstract

The invention relates to a method for the creation of a mechanical connection of round bars for concrete and also to such a mechanical connection and to a round bar for concrete permitting the method to be implemented, and to an installation for the preparation of round bars for concrete.

It will be used in the field of construction in concrete.

Through the method, at least one round bar for concrete (1) is connected to another round bar for concrete (2), or to an anchorage point, by means of a tapped connection sleeve (3), said round bar for concrete having a nominal section Φ and at least one reinforced end (4), upset and filleted, such that the fillet base diameter d_2 is equal to or greater than the nominal section Φ of the round bar.

According to the invention, the reinforced end (4) is carried out by double upsetting, a first axial upsetting permitting the diameter of the round bar for concrete to increase, a second radial upsetting during filleting by a rolling technique.

Figure 1.