Chain Link Fence Installation Manual

A product by

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About the supplier

Jarlsø AS is a Norwegian limited liability company addressing the international telecommunication markets with a selection of products and services. Jarlsø AS was formally incorporated in the spring of 2011 as part of a re-structure process of an ongoing business operation with long traditions in serving the telecommunication markets. It was when the GSM rollout services (NRO projects) really boosted throughout all five continents in the early 1990s that the foundation for this business operation was laid.

Jarlsø AS is fully owned by Jacobsen Elektro Holding AS. A sister company of Jarlsø AS is Jacobsen Elektro AS, a company established as early as in 1891 and thereby one of the oldest electro-technical companies in Norway. The company offers ownership, construction, operation and management of power stations and substations to its customers and can also provide financing packages for projects such as the supply of turn-key transmission, distribution, generating, metering and revenue collection systems to the power industry. Both Jarlsø AS and Jacobsen Elektro AS focus their efforts in sub-Saharan Africa giving opportunity to sharing resources, competence and corporate governance. Presently, Jarlsø has subsidiaries in Shanghai, Tanzania, Kenya, Ghana, Uganda & DRC.

Product Introduction

The purpose of this installation manual is to document the proper assembly of chain link fence systems. Being considered a supplement to the design drawings, this installation manual shall provide a better understanding of the product. The trial is conducted on a 6m x 6m chain link fence as this will cover any plot dimension.

This particular test was performed with the intent to dismantle after completion. With this in mind, temporary precast foundations have been used. One should take in consideration the importance that foundations for the product are done according to provided detail designs.

The document will indicate the **complete process giving special attention to the material segment** rather than the civil works part.

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The Tools

For the **site preparation & excavation** there is the option of mechanical excavation or the more conventional manual labour by using shovels and picks. For the site levelling, several are the options but in this case, we are opting for the most simple and cost effective solution being by means of lines and water levels. For manual excavation standard hand tools are required such as indicated here.

(a) Mallet (b) Flat Shovel
(c) Pointed Shovel (d) Pointed Hoe
(e) Pickaxe (f) Mattock

For the **site levelling & assembly** of the fence materials standard hand tools and levelling equipment is needed as indicated here.

Measuring tapes, spirit level, 19mm spanners, heavy duty hand held cutters, pliers, markers and other PPE

Spool of line, plumb bob and clear 10mm water pipe

Handling & installation of the razor wire requires Personal Protective Equipment such as follows.

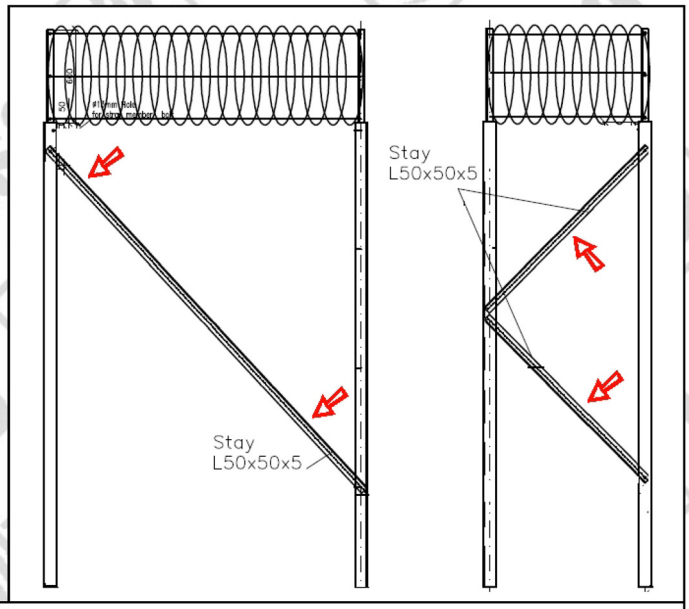
Eye protection, tick 100% leather arm length gloves and standard length 100% leather gloves are a must.

The Materials

Tensioners, tension wire, bolts and nuts may vary since such are depending on client specifications and also availability of materials during the time of order. The bolts are supplied with standard hexagon head or with round head "carriage bolt" type. For the nuts, these are also supplied in standard hexagon or in anti-tamper/anti-theft type. Such materials are as indicated here.

Chain link mesh is normally supplied in 20 meter bundles as indicated here under

Stay Supports. Depending on the dimension of the fence and also on the location of the gate, some intermediate posts will need to be strengthened further by **additional stay supports**. These supports can be in a set of 2 pcs used for posts positioned at 1m distance or as a single piece for posts that are positioned at 2m distance from each other. The stays are as indicated in this generic drawing.



The stays are manufactured with an equal angle cut according to specified measurement on the design. Each piece has 2 holes, one on each end. An example of these stays is as indicated hereunder.

Main Beams for the chain link fence can vary in quantity depending on the dimension of the site plot. Irrespective of the plot dimension, the main parts remain the same as listed and indicated here under.

(a) **Corner Post**. L75 profile, 3000mm long. Similar to intermediate posts but a corner post has 4 added holes
(b) **Intermediate** Normally L75 profile, 3000mm long. Similar to corner posts but with 4 holes less.
(c) **Razor Wire Support**. Normally L50 profile, 735mm long. Same is usable on intermediate or corner posts
(d) **Gate Post Right Side**. L75 profile, 3000mm long. With female hinge adaptor
(e) **Gate Post Left Side**. L75 profile, 3000mm long. With female hinge adaptor
(f) **Chain link fence start up/end flat bar**. Normally 30mm flat bar, around 2450mm
(g) **Connection Plates**. Used to connect flat bar "F" to the gate posts "D" & "E"

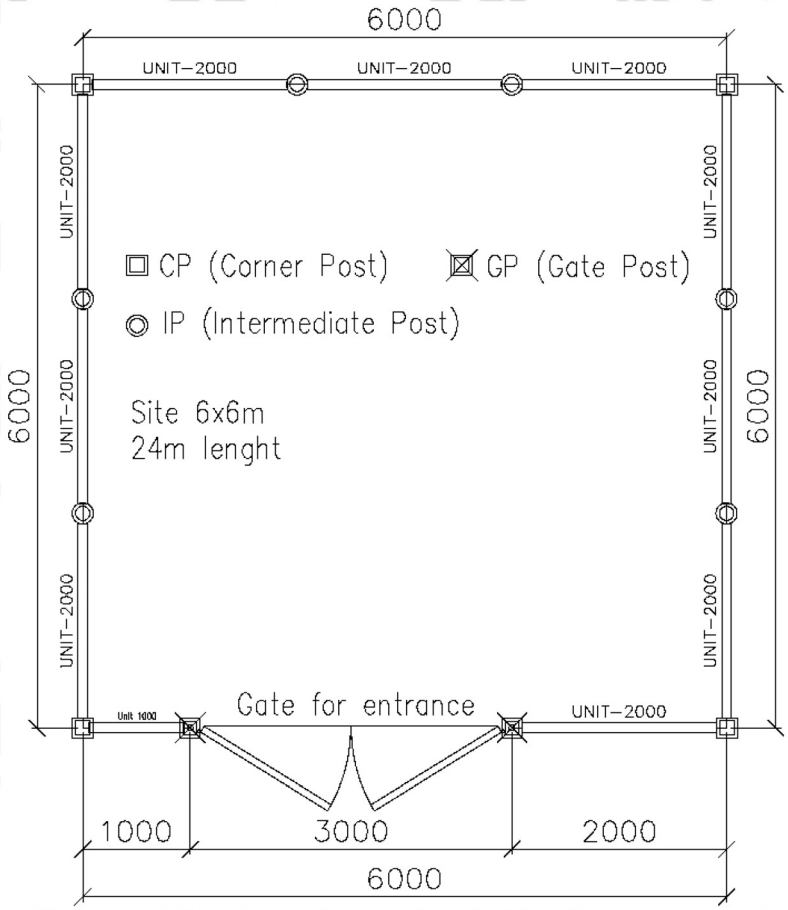
Gate is supplied with the mesh already welded. The dimension is depending on client requirements but normally each gate leaf measures around 2400mm x 1450mm. The gate is supplied with pre welded razor wire supports.

Ground Work

In this particular case, the fence size is supplied as 6m x 6m as per the indicative layout. Irrespective of the dimension, the main items for installations and way of preparing the ground work remains mostly the same.

When the lot area is identified and the **nominal ground zero decided upon, one starts by setting up the spikes and string** ***(Pic.01)*** in order to find the location of each post, for excavation preparation.

At this particular stage, ultimate precision is not so critical but keeping as close as possible to the layout design will make things far easier when setting up the posts for the fence.



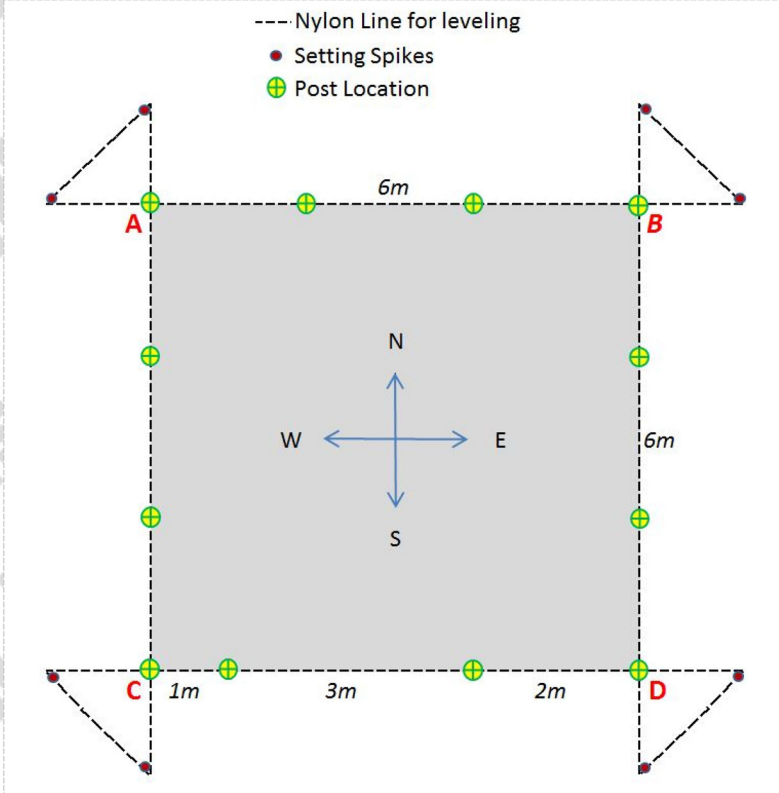
Place the first two spikes and identify the frontal section of the fence, face "C" to "D" ***(Pic.02).*** In this layout, this is marked as South face

Second step is to measure 6m from point "C" to Point "A". Before setting up the 1st spike at point "A" make sure to verify the diagonal length being exactly according to the drawing from point "A" to "D"

Continue with the same method to identify the North and East face. Make sure you verify the diagonal measurement at several stages of this process.

Make sure the string is levelled and mark each post location with a plumb bob ***(Pic.03)*** so you are sure to excavate in the correct location for each post.

Use the plumb bob again to verify the depth of each excavated hole ***(Pic.04)*** making sure the ground of each excavated hole is at the same level.



01). After nominal ground zero decided upon, starts by setting up the spikes and string.

02). Place the first two spikes and identify the frontal section of the fence, face “C” to “D”.

03). Make sure the string is levelled and mark each post location with a plumb bob

04). Excavation in progress

05). All excavation complete

06). Use the plumb bob again to verify the depth of each excavated hole

Main Structure

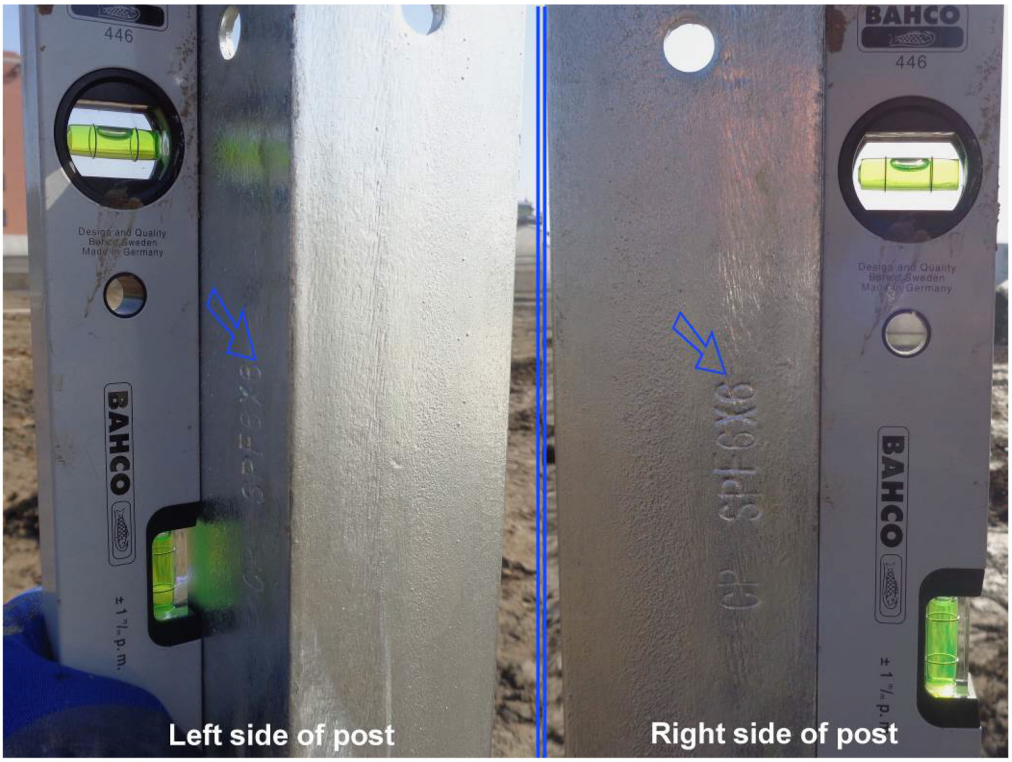
Making sure posts are accurately placed

07). Upon completion of excavation and proper levelling of the excavated ground, one should start by setting up the frontal corner posts and gate posts. It is essential that centre to centre dimensions are strictly according to provided designs.

Verify top of each post is at same level

08). Apart from placing the posts in the exact location, it is essential that they are all at the same level. In this case a hole that is on every single post is being used as the level marker. By this system, we are making sure the top of each post is at 100% same level. It is essential this is done and fully verified to be correct prior pouring the concrete.

IMPORTANT INFO: In order to hold the posts in place prior pouring, make use of temporary wooden stays or similar methodology. In this trail, precast removable foundations have been used.



Individually leveled, perpendicular to ground

09). Prior pouring, it is essential that each individual post is also levelled separately. Place a spirit level on both sides of each pole and make sure it is accurately positioned, completely levelled in each direction/perpendicular to the ground.

Verify top of each post is at same level

10) Level the remaining corner posts and gate posts with the same method being described. In addition, one can also make use of the spool of line to verify each post is exactly at the same level by placing a tensioned line in between two corner posts on top of the posts and making sure the top of the gate posts and any intermediate posts are at the same level from top.

IMPORTANT INFO: In order to hold the posts in place prior pouring, make use of temporary wooden stays or similar methodology. In this trail, precast removable foundations have been used.

Installing any support stay prior pouring.

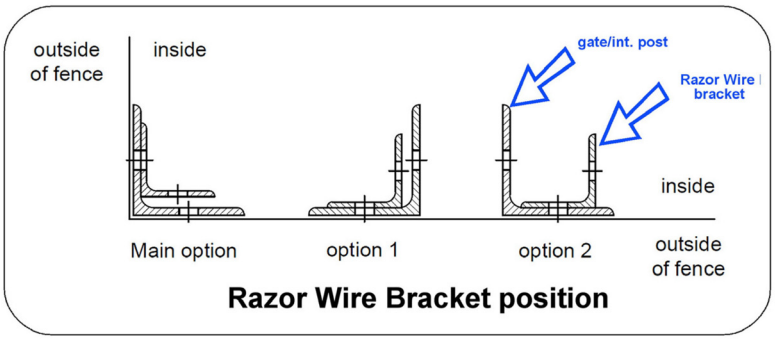
11). Make sure to install any support stay at this point in time. By doing so, you are further securing that the structure as a whole is fully levelled. In addition, the stays support the posts during concrete pouring.

Verify gate fits. Follow by pouring the concrete. All at once or pour in segments

12) Good practice is to verify that gate fits perfectly and that both posts are actually levelled. One method could be to; verify the gate posts are still 100% levelled and pour the concrete for the gate posts and let concrete harden before moving the gate. Pure the concrete for all other posts after gate posts are set dry. ***Installation method may defer as preferred by contractors.***

IMPORTANT INFO: In order to hold the posts in place prior pouring, make use of temporary wooden stays or similar methodology. In this trail, precast removable foundations have been used.





Razor Wire Bracket position

13). The razor wire support can be installed at this stage or at an earlier stage as preferred by the installer. The positioning is depending on the plot size. The bracket can be installed in several positions as described here.

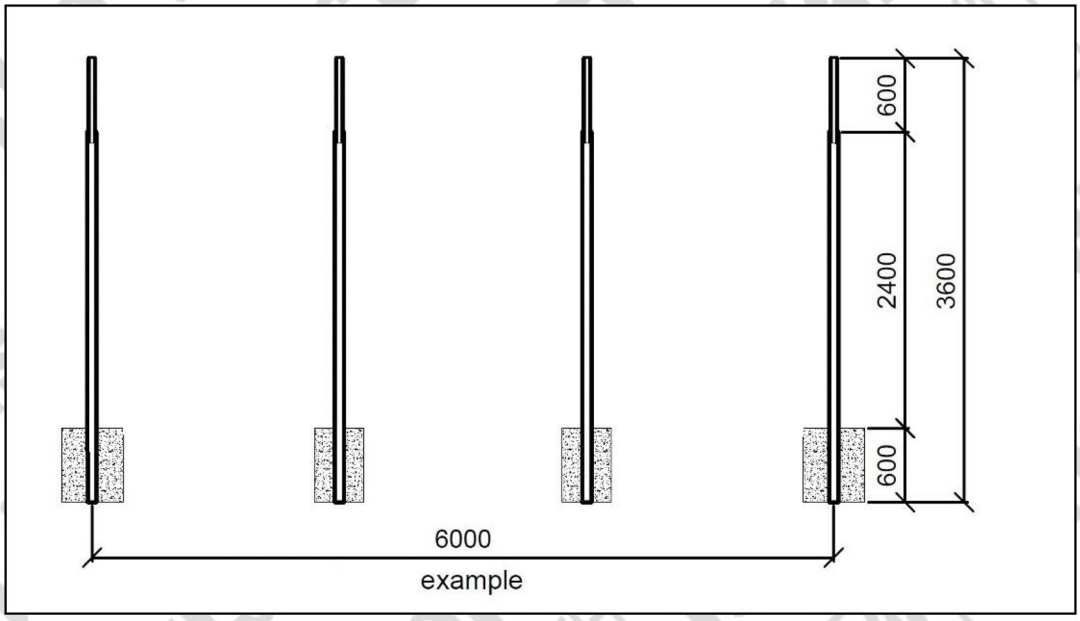
Main Structure - Summary & Design

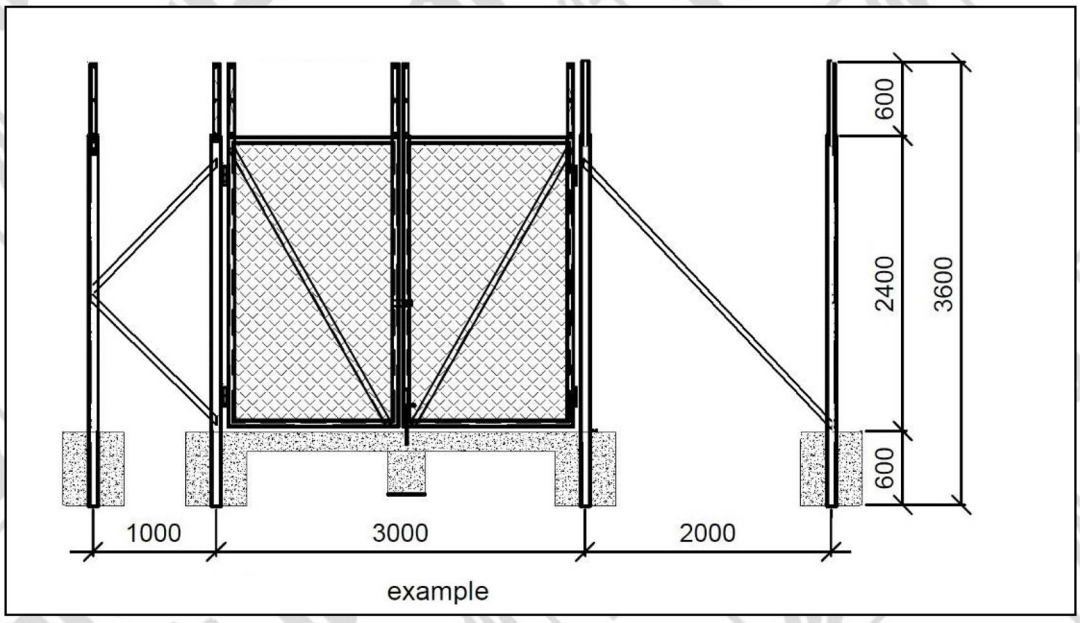
- Make sure the excavation is done as per provided designs
- Make sure excavated ground is all levelled
- Level the site frontal corner posts and gate post
- Make sure each post is also independently levelled
- Use cord or water level to install remaining intermediate or corner posts
- Install any support stay
- Install the gate making sure it fits
- Pour the concrete for gate posts and let set
- Pour the concrete for everything else after the gate posts are dry.
- Install the razor wire brackets

Remember

- Hold the posts in place prior pouring by making use of wooden stays or similar methodology.

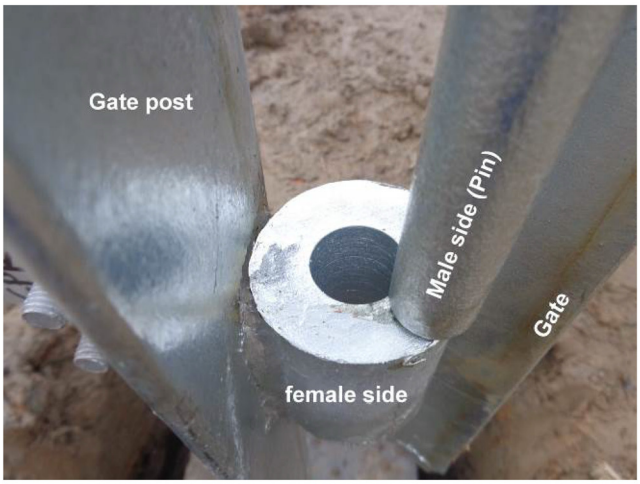
Post design example





The Gate

The gate is supplied with pre-installed mesh as shown on page five of this document. As a standard this is supplied double leaf, each 1.5m. Weight of the gate can be easily handled by two individuals



14). Lift one leaf at a time and position the male side of the hinge onto the female side, on the gate post.

15). Make sure top and bottom hinge are aligned. Lower the gate so that the hinge is set.

16). On the gate post, over each hinge, you will notice a 13mm hole.

17). Make use of a carriage bolt with shear nut as shown here.

18). When to bolt is inserted, the gate cannot be lifted out of place, hence avoiding tampering.

19). Tighten the nut until it shears. This will stop any unwanted site access via removal of the gate.

20). The gate is locked by a hasp and staple as indicated here.

21). The gate is supplied with a drop bolts indicated here

22. Gate is installed and secured

Tension Wire Installation

Tension wire and tensioners installation is not complicated but can be time consuming, especially on larger perimeters.

In this particular case, the fence size is supplied as 6m x 6m as per the indicative layout. Irrespective of the dimension, the method of installation remains the same.

Connect the tension wire at the fixed end ***(Pic.23)*** on the posts and razor wire support. The tension wire must pass from the outside of the perimeter as indicated in this diagram. The wire shall be **put in front of the corner & intermediate posts** ***(Pic. 26 & 27)***

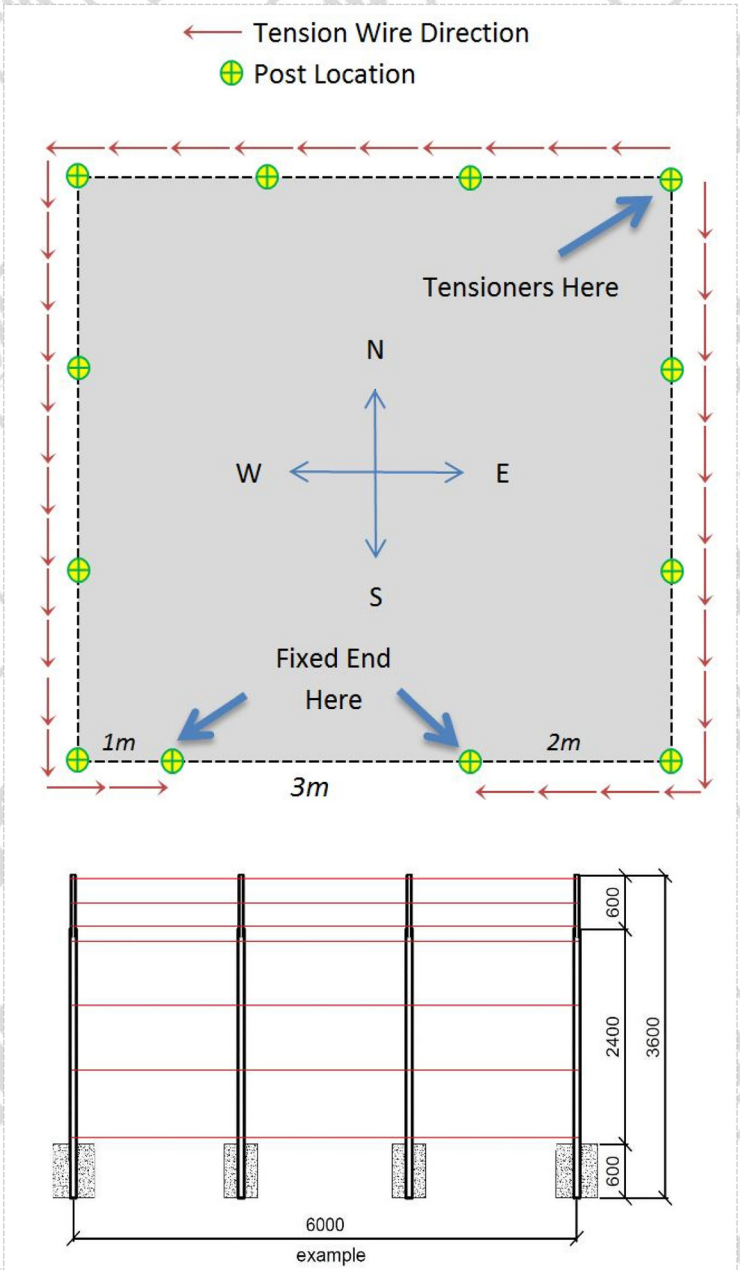
Connect also the tension wire to the tensioner on the other end ***(Pic.24 & 25).***

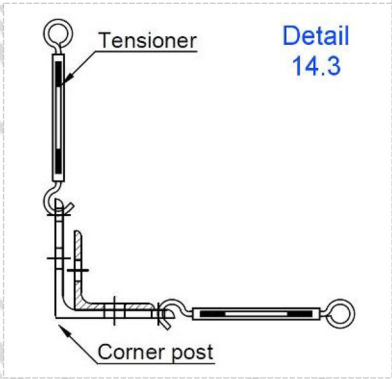
Connect the tensioners to the posts ***(Pic.28 & 29 & detail 14.3).*** Depending on the method of manufacturing there are two options to connect at this location.

Follow the same method for **all other tension wires and connect accordingly.** ***(Pic 30 & 31)***

Before you start to tighten the wires, **put small piece of wire to support the tension wire in place.** ***(Pic.32 & 33).*** Don't tighten these small pieces of wire at this particular stage.

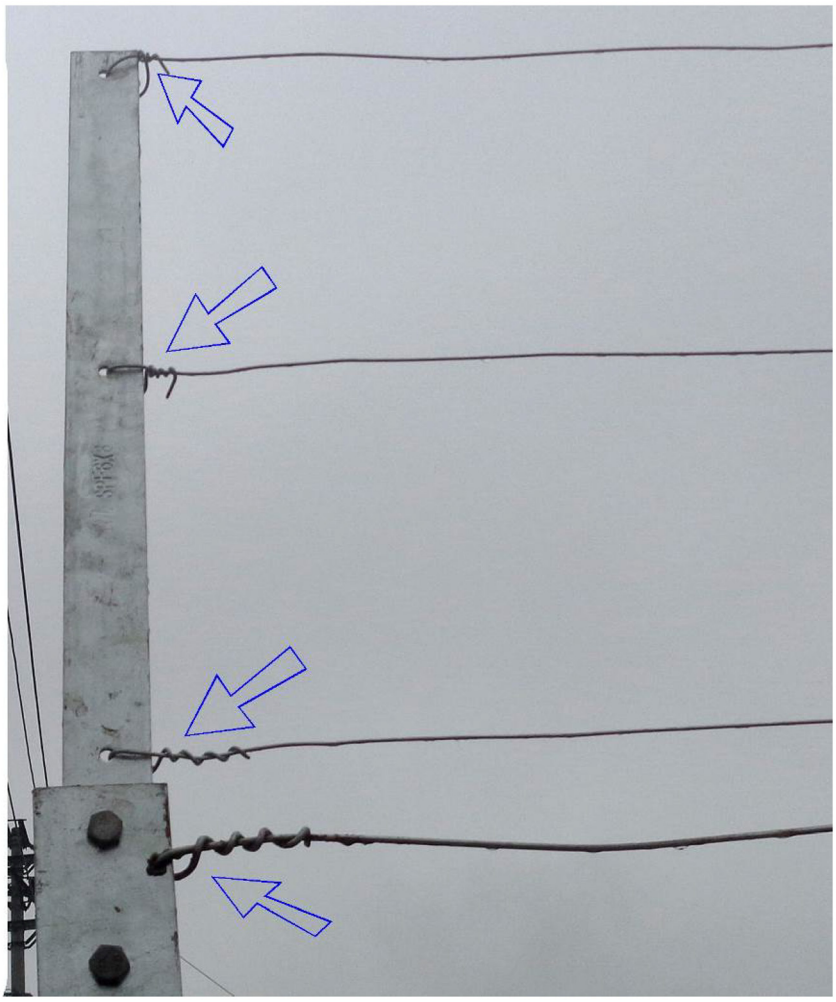
Tighten all the tensioners making sure the tension wire is properly but not over stretched. When satisfied with the tension obtained, start **tightening the small pieces of wire as indicated.** ***(Pic. 36 to 37)***





SUMMARY

- Connect the tension wire at the fixed end *(Pic.23)*
- Connect tension wire to tensioner on other end *(Pic.24 & 25).*
- Connect the tensioners to the posts *(Pic.28 & 29 & detail 14.3)*
- Fix other tension wires and connect accordingly. *(Pic 30 & 31)*
- Put piece of wire to support the tension wire in place. *(Pic.32 & 33)*
- Tighten all the Tensioners
- Tighten the small pieces of wire as indicated. *(Pic. 36 to 37)*



23). Connect the tension wire at the fixed end of the posts and razor wire support as indicated here or similarly.

24). Connect the tension wire to the tensioners as described here or in a similar way

25). Connect the tension wire to the tensioners as described here or in a similar way

26). The tension wire must pass from outside of the intermediate posts as indicated here

27). The tension wire must pass from outside of the corner post as indicated here

28). Connect the tensioners to the posts and razor wire support as described here or in (Pic.29)

29). Connect the tensioners to the razor wire support as described here or in (Pic.28)

30). View from inside of tension wires and tensioners.

31). View from outside of tension wires and tensioners.

32). **PRIOR** tensioning the wire, put small piece of wire as indicated here but **DON'T** tighten them.

33). **PRIOR** tensioning the wire, put small piece of wire as indicated here but **DON'T** tighten them.

34). Tighten the small pieces of wire after all tensioners are tightened (View from inside)

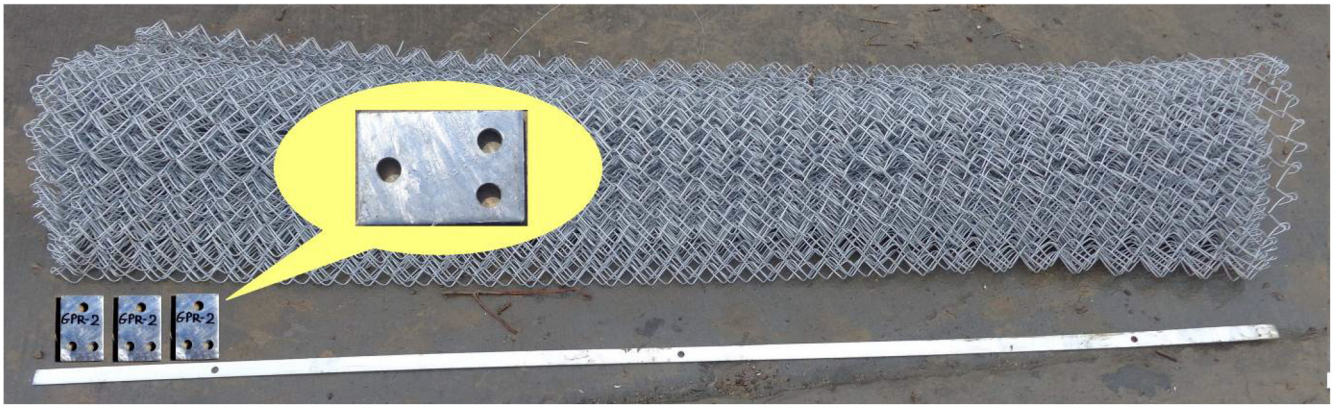
35). Tighten the small pieces of wire after all tensioners as tightened (View from outside)

36). Tighten the small pieces of wire after all tensioners are tightened (View from inside)

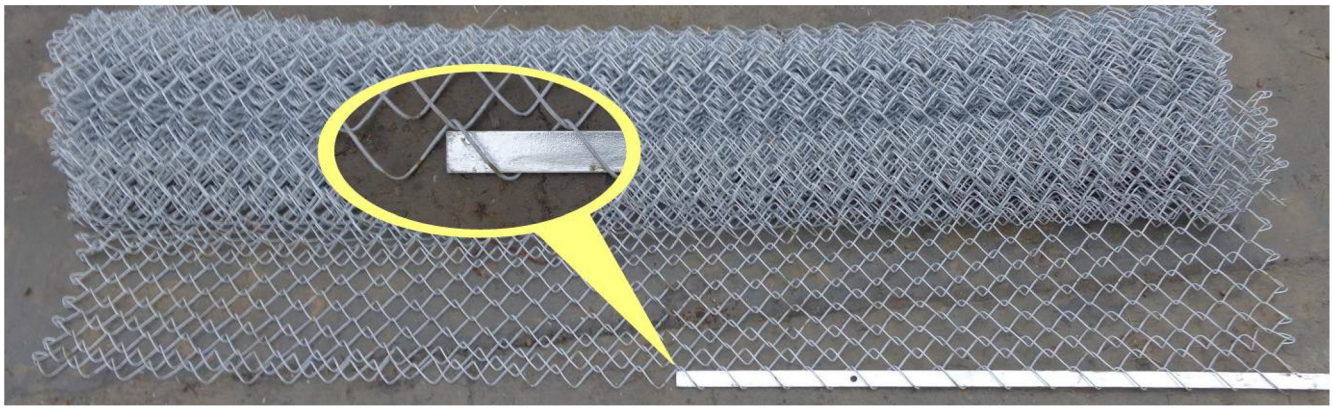
37). Tighten the small pieces of wire after all tensioners are tightened (View from outside)

Chain-link mesh

Mesh is supplied in rolls of 20 meters or similar. Here follows the installation process.



38). To start with, prepare the chain-link mesh, flat bar and connection plates. You will need a total of 3 connection plates for every flat bar. Total 2 flat bars, normally one on each side of the gate post.



39). Start by inserting the flat bar from one end to another making sure every link is held by the flat bar.

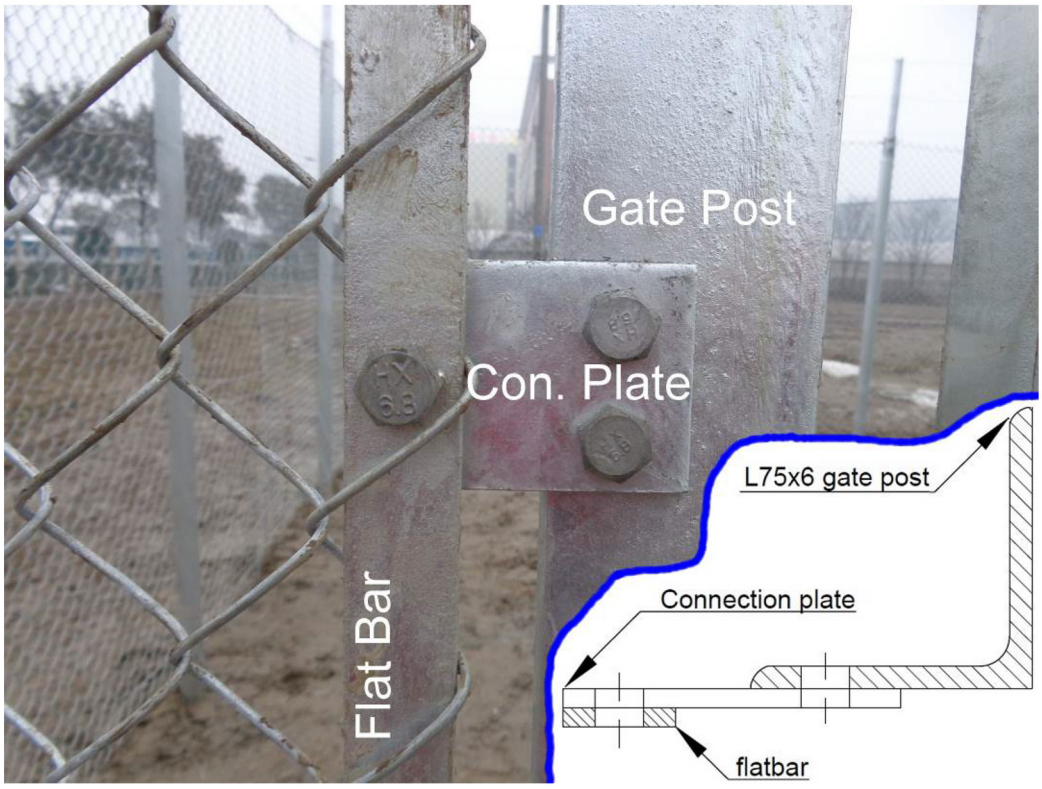
40). The end result after the flat bar is completely inserted.

Connect the 3 plates to the gate post as indicated here. These will serve to connect the flat bar and chain-link fence. You can start at any side of the gate. You can also start simultaneously on both sides of the gate and connect the chain-link mesh at the intermediate location as soon as both sides meet.

The chain-link mesh can be joined together on the ground or when it is already vertical, partially installed.

Joining on the ground, prior installation is easier. It is also much easier to remove access mesh when it is installed.

As soon as the mesh, flat bar and the 3 connection plates are set, ***(Pic. 41)*** you can start by rolling the chain-link mesh on the outside of the fence and begin connecting the same mesh to the tensioned steel wire.



41). Use 3 bolts per plate and connect as indicated here

Pull the mesh **tight** to **avoid** bulges and **sag**

42). Start laying the chain-link mesh moving gradually from one post to another, **MAKING** sure you always pull the chain-link mesh away from the start up connection. This will **secure proper fit onto the tension wires** and it will **avoid any sagging**.

43). **For a 1 meter panel** as indicated here, connect the chain-link mesh to the tension wire & posts **at least in 12 locations**. (Ref. next page)

44). **For a 2 meter panel** as indicated here, connect the chain-link mesh to the tension wire & posts **at least in 16 locations**. (Ref. next page)

45). **View from inside** the fence. A typical way of connecting the chain-link mesh to the tension wire.

46). **View from inside** the fence. A typical way of connecting the chain-link mesh to the tension wire.

47). **View from inside** the fence. A typical way of connecting the chain-link mesh to the tension wire.

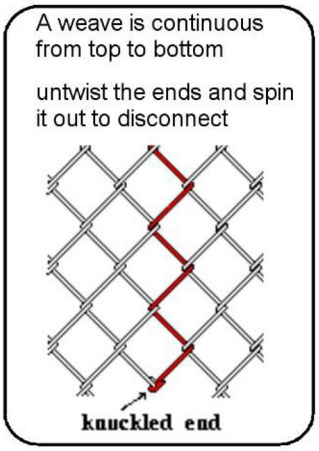
48). **View from Outside** the fence. A typical way of connecting the chain-link mesh to the tension wire

49). **View from Outside** the fence. A typical way of connecting the chain-link mesh to the tension wire

50). **View from Outside** the fence. A typical way of connecting the chain-link mesh to the tension wire

Chain-link mesh – Joining

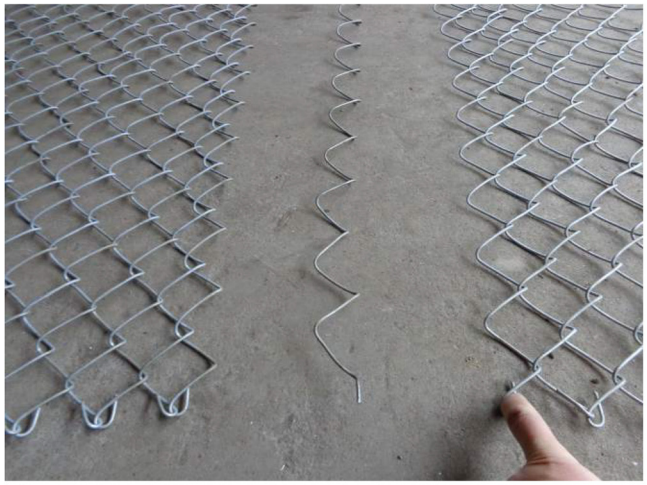
The chain-link fence can be weaved together but this can be a little tricky, if never done before, and requires some practice and explanation.



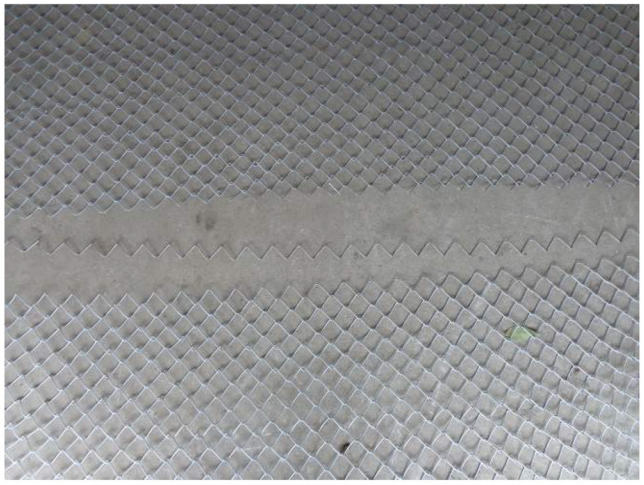
1. When a roll if installed, roll out another roll.
2. Each weave is continuous from the top to the bottom along the vertical or height of the roll. If you follow the strand, starting at the top, you will see that it zig-zags back and forth to the bottom. It starts and ends with a 'knuckled' end.
3. To remove a weave, unbend the end of the weave 'knuckle'. Unbend the adjacent weave that is knuckled to it. ***(Pic. 51)***
4. Follow the weave to the other end as it zig-zags back and forth and untwist or un-knuckle the opposite end. Be certain you follow carefully, so you undo the proper weave.
5. At the top of the fence or the bottom, spin the weave in a counter-clockwise direction, as if to unscrew it from the roll. Most manufactured chain link spins out counter-clockwise but some may spins out clockwise. Continue spinning and you will see the other end unweaving from its adjacent weaves. If you are having difficulty, you may have disconnected the wrong weaves at the opposite end. Also check that you have bent the far end straight or it will snag as you try to spin it. Another problem that may occur is the chain link is stretched to tight; give yourself some slack.
6. The procedure for weaving two rolls together is just the opposite except it can be tricky getting started. It is easiest to weave two rolls together when they lay flat on the ground, however rolls may be wove together in the upright position as well

To start weaving:

7. Chain link forms squares or 'diamonds' as they are frequently called. You must match two sections or rolls together before you start weaving in such a way that one roll has a full diamond and the other roll has a half diamond. This match will be at the top and bottom of the rolls.
8. When you add a weave, you will end up with a full diamond and two ends to knuckle or twist together.
9. Spin the single weave into the first full diamond. Spin it through the next full diamond of the other roll ***(Pic. 53).*** Continue spinning and make certain that the weave end goes through each full diamond on each roll in each revolution ***(Pic. 55).***
10. After you have successfully woven the two rolls together, twist or re-knuckle the ends together. ***(Pic. 56).***
11. Refer to next page for illustrations of such process.



51). To remove a weave, unbend the end of the weave and the adjacent weave that is knuckled to it.



52). To remove a weave, unbend the end of the weave and the adjacent weave that is knuckled to it.

53). Spin the single weave into the first full diamond. Spin it through the next full diamond of the other roll

54). Spin the single weave into the first full diamond. Spin it through the next full diamond of the other roll

55). Continue spinning and make certain that the weave end goes through each full diamond.

56). After you have successfully woven the two rolls together, re-knuckle the ends together

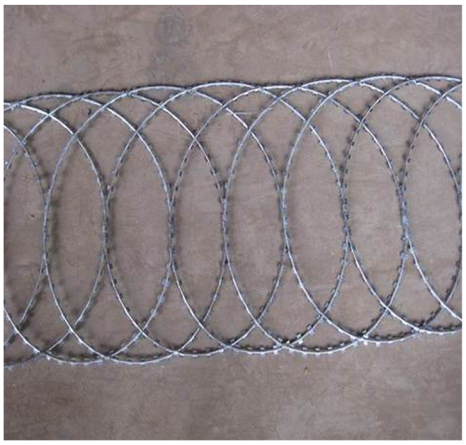
Flat wrap razor wire or concertina type.

Installation of the razor wire needs to be done by experienced individuals and they must be fully kitted with safety equipment some of which is described in page 3 of this document. The chain-link fence can be supplied as concertina razor wire or flat wrap razor wire. Jarlsø provided fence can accommodate both types of wire. The characteristics of these two types are as indicated hereunder.

Take note that when installing the concertina type; you will need to install the upper and lower tension wires. When installing the flat wrap type all 3 tension wires must be installed.

Other installation methods can be used as desired by the client or in accordance to local practices.

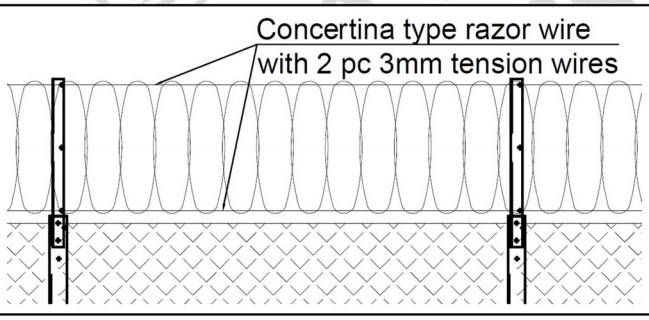
57). CONCERTINA type, unpacked



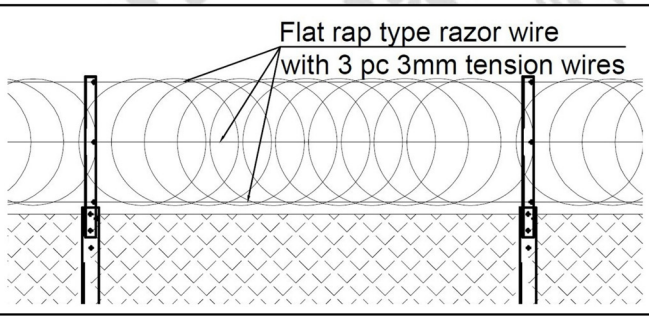
58). FLAT WRAP type, unpacked

59). CONCERTINA type, packed

60). FLAT WRAP type, packed



61). CONCERTINA type, typical design layout



62). FLAT WRAP type, typical design layout

63). Tension wires installed as described earlier. Quantity depends on type of razor wire product type.

64). Tension wires installed as described earlier. Quantity depends on type of razor wire product type.

65). **Start laying the razor wire on top of the tensioned wire, attached with pieces of tension wire. It is much faster if you have two persons working together, one on the inside of the fence and the other on the outside. Continue with the same process to cover the entire fence length**

The gate here is installed with Concertina type on the left leaf and flat type on the right leaf. It is essential that the razor wire is connected to the tension wires in several locations as described in the next page

66). Connect the concertina type razor wire to the tensioned wire in several locations as described.

67). Connect the flat wrap type razor wire to the tensioned wire in several locations as described.

Connect the razor wire to the tensioned wire ropes as indicated here.

It is essential you connect in many locations as described.

Give extra connections at the corner posts and at start/end point of the razor wire

Other installation methods can be used as desired by the client or in accordance to local practices & trends.

Concertina

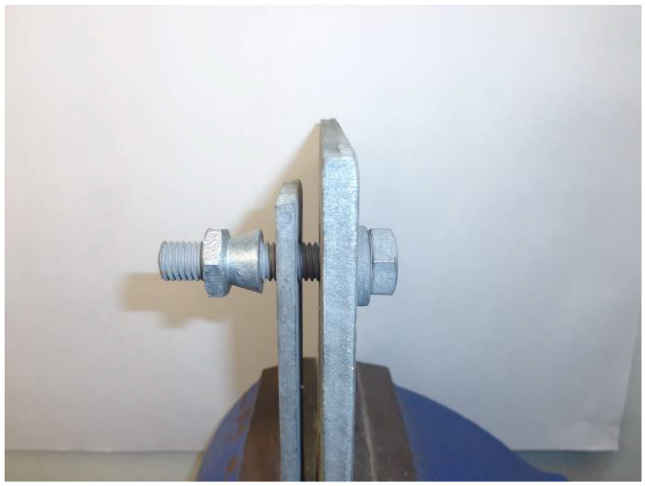
Concertina

Flat Wrap

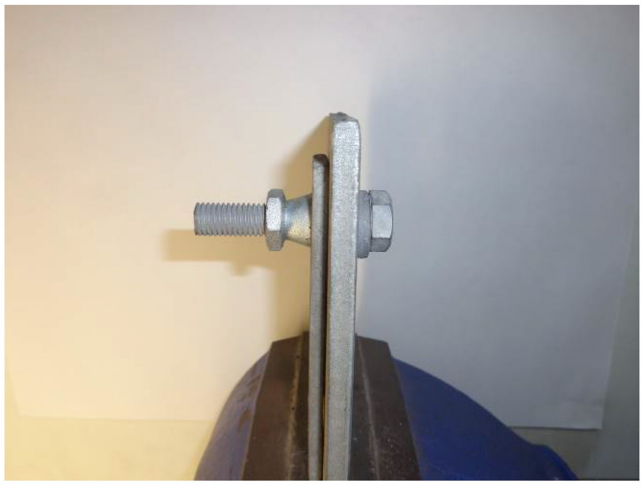
Flat Wrap

Shear Nuts.

Fence can be supplied with shear nut and carriage bolt for added security. The shear nut installation is as follows:



68). Use the nut and bolt in similar way to connect two objects. In this case a 10mm plate & 6mm flat bar

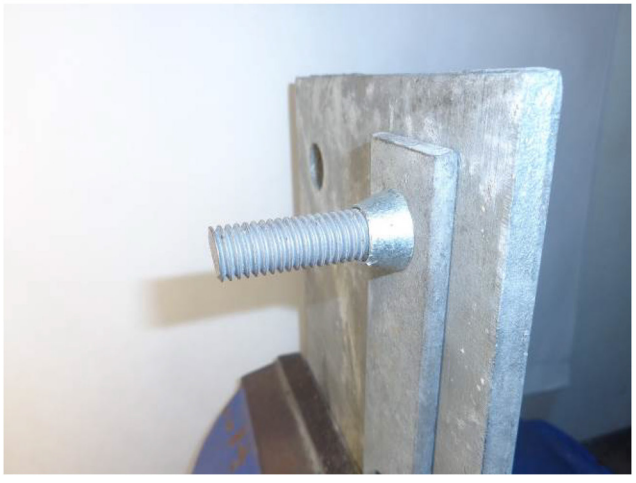


69). Tighten the nut until both objects are in place.

70). Use the spanner and increase tightening.

71). Tighten until the nut is broken in two portions.

72). Throw away the access nut portion



73). The final result is as shown here

Additional info & site views.

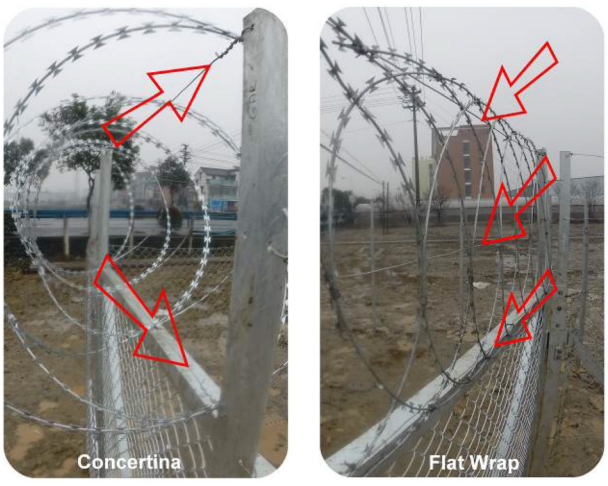
74). 6 x 6 site view, partially complete

75). View from inside of the connection "Gate post/Chain-link mesh

76). Inside view of corner post & razor wire support

77). Inside view of gate post & razor wire support

78). Side view of concertina razor wire



79). View of installed razor wire.

Contact details.

We thank you for purchasing this product and hope the user manual in conjunction with provided designs can support your installation

For further assistance, explanation or re-order, kindly contact Jarlsø team via email or phone.

Contacts are available on our web page
www.jarlso.com

Thanks
Jarlsø AS team