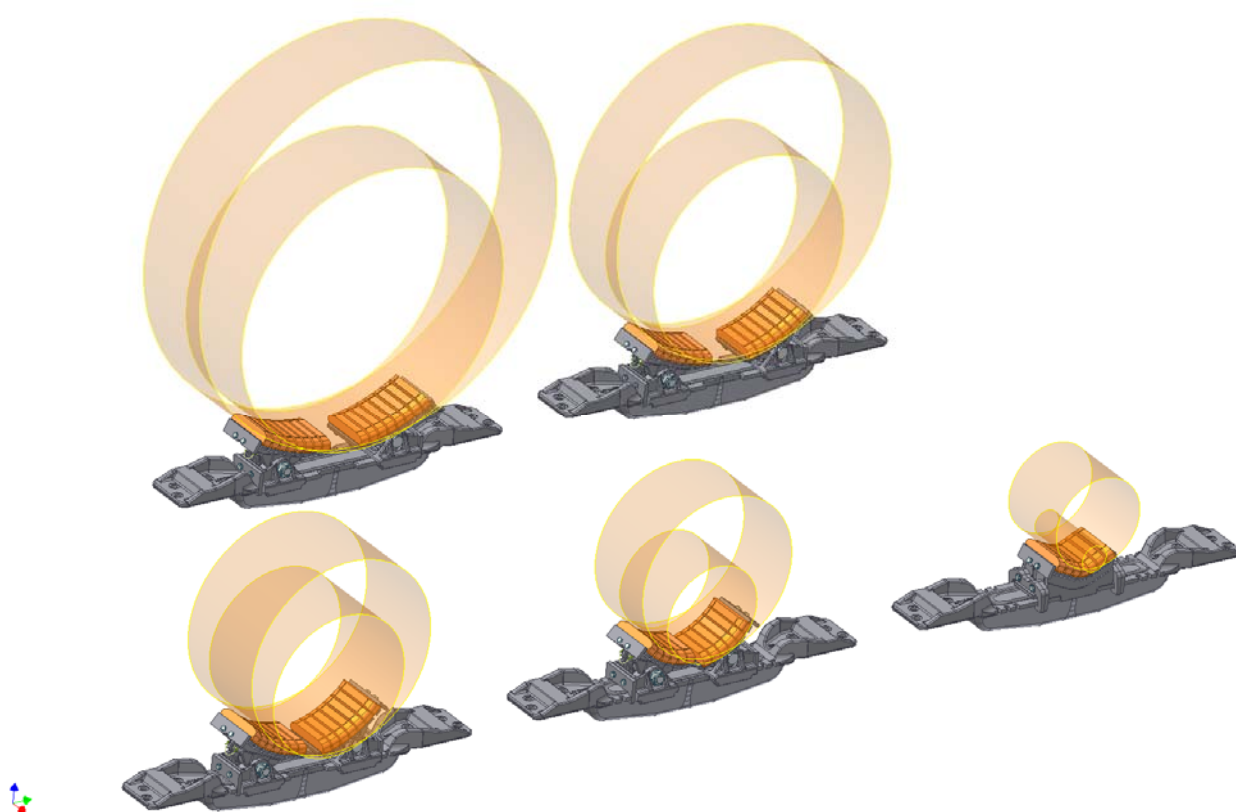





Standard Pivoting and Fixed Saddles for Pipe Tensioners

(Chain pitch 215,9 mm)



OPERATING AND MAINTENANCE MANUAL

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	II

OPERATING AND MAINTENANCE MANUAL REVISION LIST

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Attached/included into this manual the operator can find the following documents:

- SCHEMATIC DRAWINGS AND SPARE PARTS LISTS



	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	III

TABLE OF CONTENTS

1. GENERAL INFORMATION.....	1-1
1.1. INTRODUCTION.....	1-1
1.2. WARRANTY	1-1
1.3. CUSTOMER LIABILITY	1-1
1.4. TECHNICAL SERVICE	1-1
1.5. LIST OF SPARE PARTS.....	1-1
1.6. TECHNICAL SPECIFICATIONS AND STANDARDS	1-1
1.7. RESIDUAL PRODUCTS AND ENVIRONMENTAL PROTECTION.....	1-1
1.8. GUIDELINES TO THE IDENTIFICATION OF DRAWINGS	1-2
2. GENERAL DESCRIPTION AND OPERATION	2-1
2.1. DESCRIPTION.....	2-1
2.2. OPERATING ENVIRONMENTAL CONDITIONS.....	2-1
2.3. QUANTITY OF PARTS.....	2-2
3. SAFETY AND ACCIDENT PREVENTION	3-1
3.1. HAZARDS AND DANGEROUS AREAS.....	3-1
3.2. PERSONNEL REQUIREMENTS.....	3-2
3.3. GENERAL SAFETY REQUIREMENTS.....	3-2
3.4. GENERAL MAINTENANCE SAFETY REQUIREMENTS.....	3-3
3.5. OPERATORS PERSONAL PROTECTION.....	3-3
4. INSTALLATION AND REMOVAL	4-1
4.1. TIGHTENING TORQUES.....	4-1
4.2. FIXED SADDLES.....	4-1
4.3. OSCILLATING SADDLES.....	4-5
5. MAINTENANCE.....	5-1
5.1. ORDINARY MAINTENANCE	5-1
5.2. CHECKS	5-1
5.3. CLEANING	5-2
5.4. STORAGE	5-2
6. DRAWINGS AND PARTS LIST	6-1
6.1. PIVOTING SADDLE BASE (DWG. NO. 161.20.000)	6-2
6.2. 14"-24" PIVOTING SADDLE (356-610 MM PIPE O.D.) (DWG. NO. 161.01.000)	6-4
6.3. 24"-32" PIVOTING SADDLE (609-813 MM PIPE O.D.) (DWG. NO. 161.02.000)	6-6
6.4. 32"-46" PIVOTING SADDLE (810-1170 MM PIPE O.D.) (DWG. NO. 161.03.000)	6-8
6.5. 32"-60" PIVOTING SADDLE (810-1524 MM PIPE O.D.) (DWG. NO. 161.04.000)	6-10
6.6. 4"-14" FIXED SADDLE (101-356 MM PIPE O.D.) (DWG. NO. 161.05.000)	6-12
6.7. 16"-30" PIVOTING SADDLE (407-762 MM PIPE O.D.) (DWG. NO. 161.06.000)	6-14

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	1-1

1. GENERAL INFORMATION

1.1. Introduction

This Instruction and Operation Manual (IOM) has been prepared to be a useful aid to the people who will have to operate the equipment. It will give them the necessary information about its use and maintenance. This document satisfies the requirements stated for the machine documentation by the European Council Directives on the machine safety at work.

1.2. Warranty

The warranty will cover all the materials used in the manufacturing for the period specified in the contract, starting from the delivery date. In case of fault of components during the warranty period, if asked for, the manufacturer will revise the design, repair the damaged components or solve the problems of the operating units that are related to these components.

1.3. Customer liability

If not otherwise specified in the contract, the customer will provide for the transport and the related insurance against damages caused by third parties.

1.4. Technical service

If not otherwise specified in the contract, the manufacturer will assist the customer during the assembling of the machine and the commissioning phase. The manufacturer will also be the reference contact for the extraordinary maintenance. No other Companies, if not otherwise specified into the contract, will be authorized in performing maintenance operations on the RE.MAC.UT.'s machines.

1.5. List of spare parts

The list of spare parts is included in the present document.


1.6. Technical specifications and standards

The technical department referred to internal specifications for the machine design. All drawings refer to ISO standards.

1.7. Residual products and environmental protection

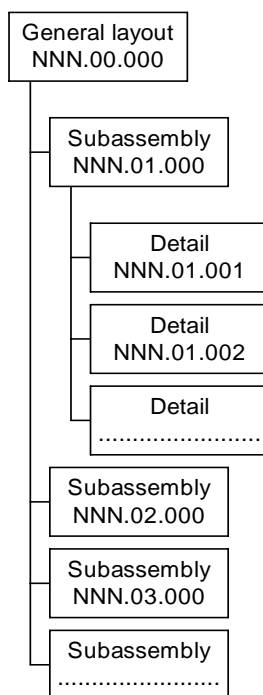
The machine does not produce residual products.

It is recommended to dispose of worn parts or replaced lubrication fluids in dedicated containers.

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	1-2

1.8. Guidelines to the identification of drawings

Drawings have been organised following the *exploded view* principle. Therefore the identification numbers start from the top level of the general layout sheet, which calls out the machine subassemblies. The second identification level refers to the subassembly sheets (or units) in which the single parts (or details) are called out.




WARNING

The above codification is applied both to the **drawing number** and to the **reference number**.

- The **reference number** is used to trace each part of a subassembly into this manual with reference to the drawing balloons (i.e.: part Ref. No. 3 in subassembly drawing 01 of equipment no. 161 = Ref. No. 161.01.003). The reference number is always referred to into this document, when describing some assembling or disassembling procedure.
- The **drawing number** identifies each part for the construction, and is built up in the same way as described before. This number must be used for the order of the spare parts (refer to section n. 6) and can be found into the parts lists.

Do not confuse the reference number with the drawing number (i.e.: part with Ref. No. 161.01.003 in this machine has Dwg. No. 550.08.004 because is a part already designed for another equipment).

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	2-1

2. GENERAL DESCRIPTION AND OPERATION

2.1. Description

Depending on the required pipe diameter to be processed, the pipe tensioner must be equipped through the installation of different pipe saddles on the cross members of its tracks.

This family of has been designed for the track chains having a 215,9 mm pitch, to process pipe with an outside nominal diameter ranging between 4" and 60".

The pipe nominal range is covered by the following set of fixed/pivoting subassemblies:

Description	Pipe O.D. range	Dwg. No.
Fixed base and saddles	4"-14" (101 – 356 mm)	161.05.000
Pivoting saddle base	14"-60" (356 – 1524 mm)	161.20.000
Pivoting saddle	14"-24" (356 – 610 mm)	161.01.000
Pivoting saddle	24"-32" (609 – 813 mm)	161.02.000
Pivoting saddle	32"-46" (810 – 1170 mm)	161.03.000
Pivoting saddle	32"-60" (810 – 1524 mm)	161.04.000
Pivoting saddle	16"-30" (407 – 762 mm)	161.06.000

Each saddle subassembly supports a set of rubber pads, that have to be installed and blocked through a screwed plate to be firmly held in place.


Two types of saddles set can be installed: fixed and pivoting.

- The fixed saddle consists of a single base directly supporting the rubber pads.
- The pivoting saddles consists of two bases that must be symmetrically installed on the cross members of the tensioner tracks. Each base is completed by a pivoting support holding the rubber pads.

2.2. Operating environmental conditions

The equipment has been designed to operate within the following range of environmental conditions:

ENVIRONMENT	Marine (salty)
OPERATING TEMPERATURE RANGE	From -10°C to +45°C
MAXIMUM RELATIVE HUMIDITY	95%

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	2-2

2.3. Quantity of parts

The number of rubber pads to be installed on each saddle depends on the pipe diameter range, and so on the saddle type according to the preceding table and the subassembly drawings. Refer to the schematics shown in Section 6 for the number of rubber pads to be installed on the selected saddle.

The total number of rubber pads that could be ordered for a specified pipe tensioner depends on the number of cross members installed on the machine tracks. The following table can be used by the operators to help calculating the machine stock of parts.

- n = number of cross member per track (64)
- t = number of tracks per machine (2)

Range	Item	Dwg. N.	Q.ty per saddle	Q.ty per cross member	Q.ty per track	Q.ty per machine
4"-14"	Fixed Saddle subassembly	161.05.000	-	1	1 x n	t x n
	Rubber pads	550.08.004	7	7	7 x n	7 x t x n
Common	Base subassembly	161.20.000	-	2	2 x n	2 x t x n
14"- 24"	Oscillating Saddle subassembly	161.01.000	-	2	2 x n	2 x t x n
	Rubber pads	550.08.004	6	12	12 x n	12 x t x n
24"- 32"	Oscillating Saddle subassembly	161.02.000	-	2	2 x n	2 x t x n
	Rubber pads	550.08.004	7	14	14 x n	14 x t x n
32"- 46"	Oscillating Saddle subassembly	161.03.000	-	2	2 x n	2 x t x n
	Rubber pads	550.08.004	7	14	14 x n	14 x t x n
32"- 60"	Oscillating Saddle subassembly	161.04.000	-	2	2 x n	2 x t x n
	Rubber pads	550.08.004	8	16	16 x n	16 x t x n
16"- 30"	Oscillating Saddle subassembly	161.06.000	-	2	2 x n	2 x t x n
	Rubber pads	550.08.004	6	12	12 x n	12 x t x n


	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
		Rev. N.:	0
		Rev. Date:	12/10/2008
		Page N.:	2-3



FIG. 2-1 Set for external diameter (oscillating saddles)



FIG. 2-2 Set for external diameter (fixed saddles)

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	3-1

3. SAFETY AND ACCIDENT PREVENTION

It must be taken into consideration that the particular operating requirements do not allow the design of a complete safeguarding system for the whole machine.

WARNING

The supply of the machine does not include fixed area safety guards for the process area. The machine cannot be operated without having installed around them safety guards that ensure the protection of the operators from the risks listed into the next paragraph.


3.1. Hazards and dangerous areas



It must be taken into consideration that the particular operating requirements do not allow to safeguard the moving structure. In general the following risks can be found during the operation of the equipment:

HAZARD	AFFECTED AREA	RISK	WARNINGS
Mechanical	Track chains	Entrapment Smashing	Never touch the chain and support rollers parts during the movement. Never stand near the track saddles during the chain rotation.
	Track structure	Squashing Cutting	Never touch the slide ways during the movement. Never stand below the track structures. Never access the pipe clamping area.
	Movable structures	Entrapment Smashing Squashing Cutting	Never touch the machine parts during the structures movement.
Electrical	All the junction box, enclosures	Electrical shock	The access to the electric junction boxes and enclosures must be allowed only to trained people.
Pressure	Pressurised components	Pressurised jets	Always check the pneumatic system components status before starting the operation with the machine.

The machines are provided with warning labels to highlight the dangerous area to the operator, as shown in the next pictures.

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	3-2


3.2. Personnel requirements

The equipment must not be operated by any personnel who do not qualify under the following criteria:

1. Only personnel who are responsible and authorised for the equipment operation shall operate the machine.
2. No person who has not read and understood the operating and maintenance manuals for all the equipment shall operate the machine.
3. No person who has not received a full training by a competent and authorised person shall operate the machine.
4. No person under the influence of drugs of any sort, whether medically prescribed or not, may operate the equipment unless a medical certificate is provided which states that the prescribed drugs do not impair the person physically or mentally in any way. Such certificate shall be authorised and signed by a properly qualified medical doctor.
5. All personnel authorised to operate the equipment shall have adequate sight and hearing ability as determined by a properly qualified medical doctor.

3.3. General safety requirements

1. All personnel working around the on board machines shall be made fully aware that the on board machines are in general remotely operated and that they could move/operate at any time; they must therefore be instructed about the provisioning on the machines of acoustic and/or lighting signals used to signal the machines start up and the machines operating status.
2. The position of the emergency commands shall be made known to all personnel associated with the equipment and a procedure shall be established in the event that an emergency shutdown is required. The systems must be designed to stop feeding the pneumatic or hydraulic power to the related subassemblies in case of emergency, but to maintain the parts position when the lines are not pressurised.
3. All personnel shall be made aware that pressurised hoses can be damaged and that high pressure fluids escaping from hose fractures can cause serious injury as the flailing end of a fractured hose.
4. All personnel shall be instructed to keep away from high pressure hose terminations when the equipment is operating.
5. All personnel shall be instructed about the inherent danger of working around and near moving equipment or parts such as wire ropes, motors, electrical components, etc..
6. Never exceed the design capacity of the machine and never operate it under any conditions or in any manner other than specified in this manual.
7. If necessary proceed with a signal person for the operation of the machines. In this case the signal person must be visible at all times. The operator and the signal person must agree on the signals to be used before operating the machine.
8. Never operate the machine without protective covers or guards fitted over exposed or moving gears and parts.
9. Follow the maintenance and inspection procedures before operating the machine and do not operate it if any parts are damaged.

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	3-3

3.4. General maintenance safety requirements



Never perform maintenance actions such as lubrication and greasing on moving parts.

- Before starting any maintenance, cleaning, repairing or lubricating operation always check that the electric power has been switched OFF according to the following procedure:
 - Set the main cut-out switch to OFF.
 - Set the line cut-out switch to OFF.
 - Disconnect the plugs from the sockets.
 - Position a warning table on the main cut-out switch with a “SERVICING” alert message.
- Never remove the warning labels on the machine. If some of them get worn, please contact the manufacturer for the supply of new labels.
- Always use manufacturer supplied spare parts. The use of non original spare parts could cause abnormal operating of the machine or could cause damage to the machine itself or to the operators.
- During the system servicing always remember to discharge the accumulators by the manual relief valve and to check for the 0 bar indication on all pressure gauges.
- Always check for required greasing of bearings and moving parts.
- Never mix different types of oils, greases or lubricating fluids if they are not specified in the components' maintenance manual.

3.5. Operators personal protection

The following basic personal protection items are anyway highly recommended to each operator:



Always protect the head from possible injuries from falling, suspended or supported items, or from the parts of the machines (moving or fixed) during the handling.




Always use adequate shoes to avoid skidding or to avoid injuries from falling items or strikes against lower part of the machines



Always use protective gloves to avoid injuries to the hands and to avoid contact with grease, oil or other dangerous products.

WARNING

The provision of other personal protection items is to the care of the customer and is strictly related to the particular installation and operation conditions.

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-1

4. INSTALLATION AND REMOVAL

4.1. Tightening torques

Refer to the following table for the tightening torque of the screws and bolts that are used in the equipment, both for installation reference and to periodically check the torque of the coupling item during the operational life of the line.


TYPE	DIAM. (mm)	PITCH (mm)	TIGHTENING TORQUE (Nm) UNI 5739 class 8.8	TIGHTENING TORQUE (Nm) UNI 5739 class 10.9
M10	10	1,50	36	51
M12	12	1,75	63	89
M14	14	2,00	101	142
M16	16	2,00	159	224
M18	18	2,50	217	305
M20	20	2,50	310	436
M22	22	2,50	428	601
M24	24	3,00	529	754
M27	27	3,00	796	1119
M30	30	3,50	1074	1510
M33	33	3,50	1475	2075
M36	36	4,00	1887	2653
M39	39	4,00	2460	3460
M42	42	4,50	3031	4263
M45	45	4,50	3808	5355
M48	48	5,00	4565	6419

Tightening torque is calculated as 70% of the material yield strength. Lubricated bolts and screws.

4.2. Fixed saddles

The oscillating saddles consists of base onto which the rubber pads are directly installed. This subassembly is available only for the specified small pipe O.D. range.

To equip a track with a complete set of fixed saddles.

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-2

Step	Description	Ref.
1. <input type="checkbox"/>	Prepare each saddle base Ref. No. 161.05.001 inserting 7 rubber pads Ref. No. 161.05.004 on it.	FIG. 6-6
2. <input type="checkbox"/>	Block the rubber pads through the plate Ref. No. 161.05.003 and the screws with washers Ref. No. 161.05.01N/02N.	FIG. 6-6
3. <input type="checkbox"/>	Install the saddle onto the track cross member, taking care to correctly match the center interface.	-
4. <input type="checkbox"/>	Block each saddle through the couple of brackets Ref. No. 161.05.002 and the screws with washers Ref. No. 161.05.03N/02N.	FIG. 6-6

NOTES:

- Start positioning the saddle sets in the upper part of each track.
- According to the safety requirements and procedures, command the rotation of the tracks in order to bring up other free cross members, to complete the saddle sets installation.

To remove from a track a complete set of fixed saddles.

Step	Description	Ref.
1. <input type="checkbox"/>	Remove the screws with washers Ref. No. 161.05.03N/02N and the couple of brackets Ref. No. 161.05.002 to free each saddle.	FIG. 6-6
2. <input type="checkbox"/>	Remove the saddle from the track cross member.	-

NOTES:


- Start removing the saddle sets in the upper part of each track.
- According to the safety requirements and procedures, command the rotation of the tracks in order to bring up other free cross members, to complete the saddle sets removal.

To replace the rubber pads only.

Step	Description	Ref.
1. <input type="checkbox"/>	Remove the screws with washers Ref. No. 161.05.01N/02N and the plate Ref. No. 161.05.003 to free the rubber pads.	FIG. 6-6 FIG. 4-5
2. <input type="checkbox"/>	Extract the rubber pads and replace them with new ones.	FIG. 4-5
3. <input type="checkbox"/>	Block the rubber pads through the plate Ref. No. 161.05.003 and the screws with washers Ref. No. 161.05.01N/02N.	FIG. 6-6 FIG. 4-5

NOTES:

- Start replace the rubber pads in the upper part of each track.
- According to the safety requirements and procedures, command the rotation of the tracks in order to bring up other free cross members, to complete the rubber pads replacement.

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-3

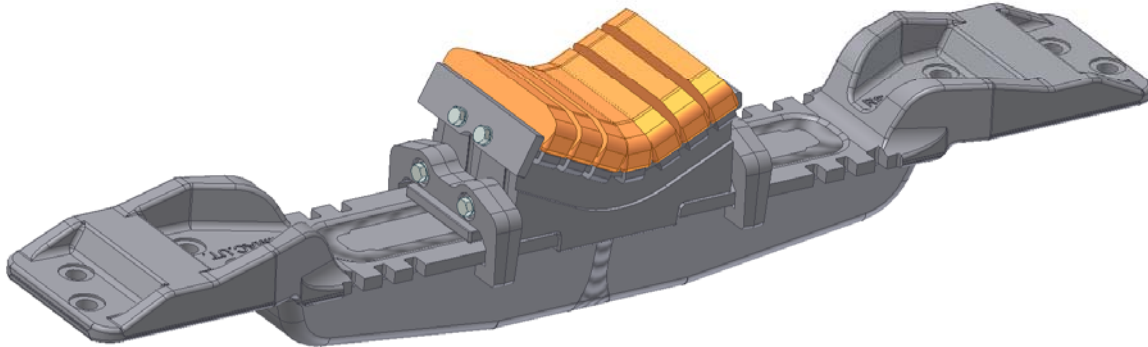


FIG. 4-1 Fixed saddle configuration (one subassembly per each track cross member)

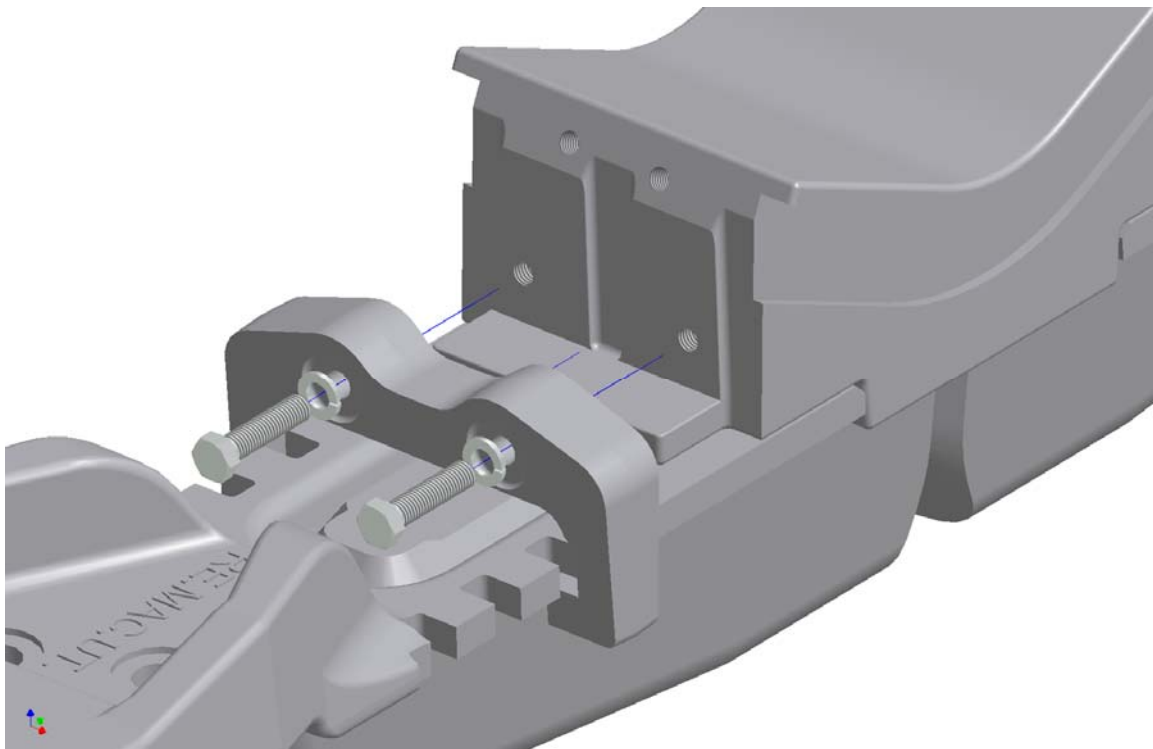



FIG. 4-2 Fixed saddle replacement – Remove brackets

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-4

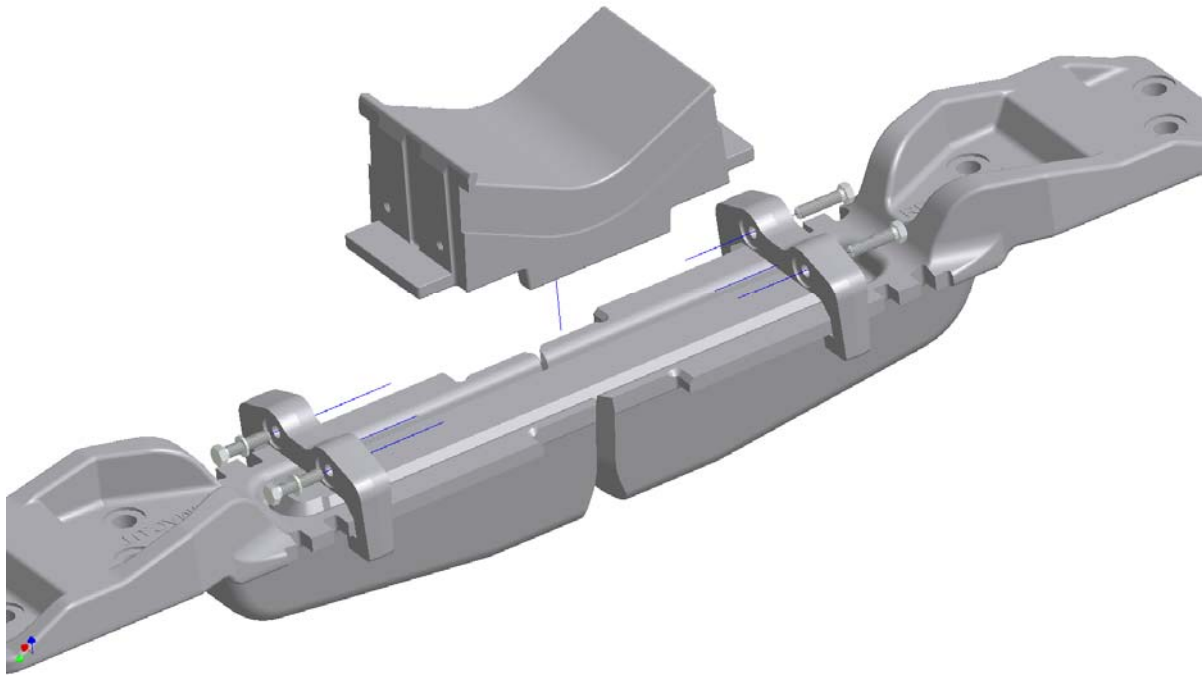


FIG. 4-3 Fixed saddle replacement – Remove saddle base

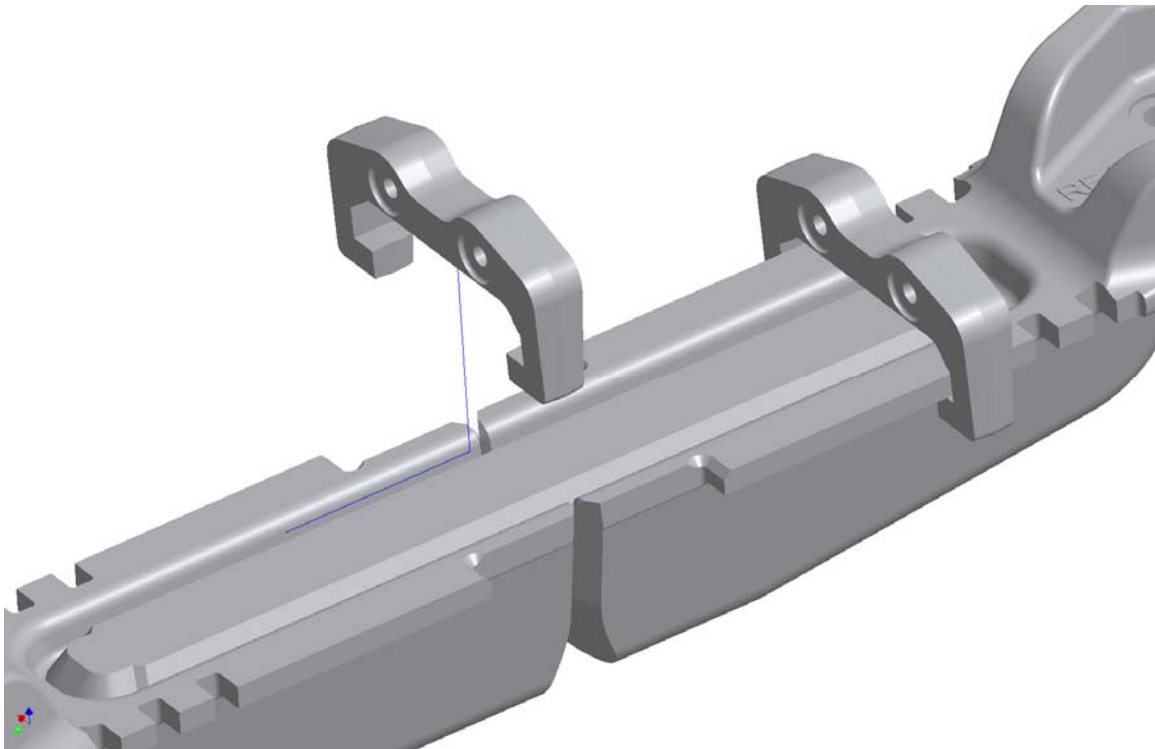



FIG. 4-4 Fixed saddle replacement – Pull out brackets

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-5

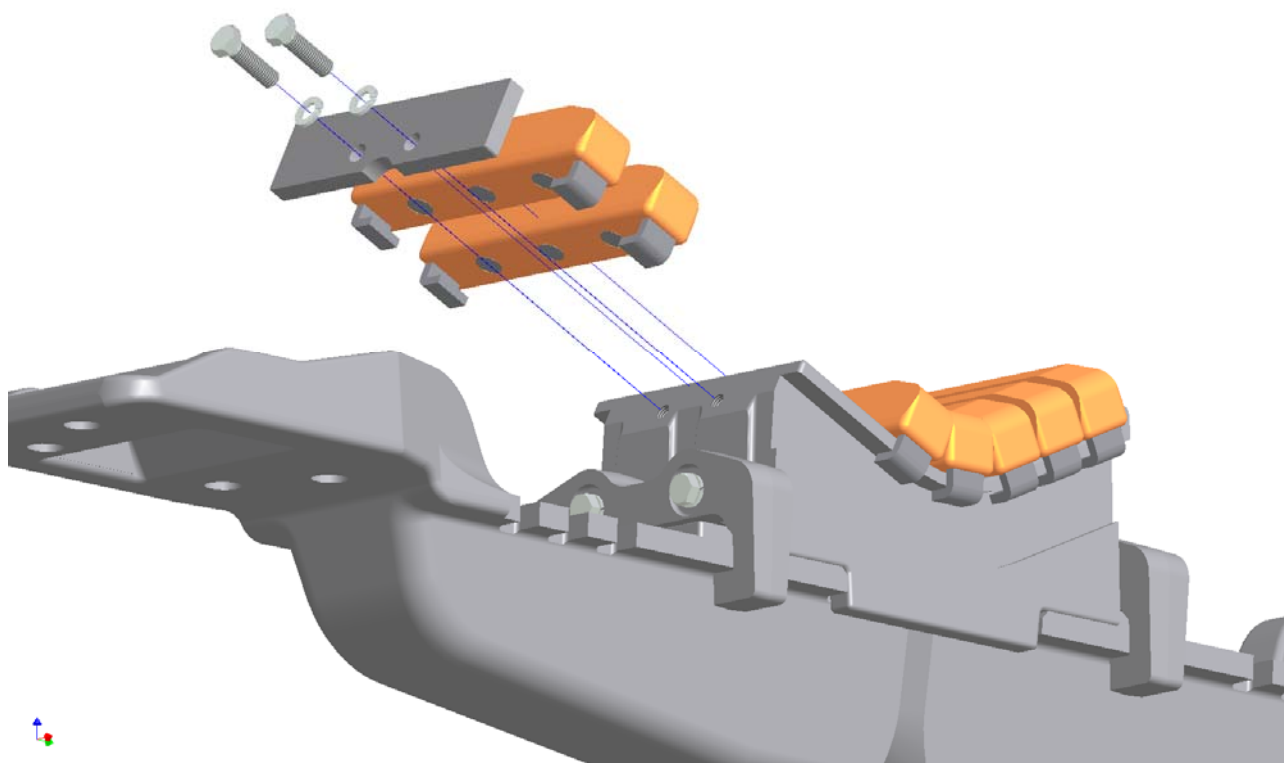


FIG. 4-5 Fixed saddle rubber pads replacement


4.3. Oscillating saddles

The oscillating saddles consists of a common base onto which different subassemblies can be installed depending on the required pipe O.D. diameter range to be processed.

After having selected the required oscillating subassembly according to the table quoted into para. 2.1 perform the following procedures.

To equip a track with a complete set of saddle subassemblies.

Step	Description	Ref.
1. <input type="checkbox"/>	Prepare each saddle Ref. No. 1 inserting the specified number of rubber pads Ref. No. 3 on it, according to the schematic included into this manual.	FIG. 6-2 FIG. 6-3 FIG. 6-4 FIG. 6-5 FIG. 6-7
2. <input type="checkbox"/>	Block the rubber pads through the plate Ref. No. 2 and the bolt Ref. No. 1N/2N/3N.	FIG. 6-2 FIG. 6-3 FIG. 6-4 FIG. 6-5 FIG. 6-7

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-6

Step	Description	Ref.
3.	<input type="checkbox"/> Install the above assembled saddles on the oscillating base, taking care that the saddle locking screw must be oriented on the same side of the base locking plates.	FIG. 4-10
4.	<input type="checkbox"/> To block the saddle on the support insert the rod Ref. No. 161.20.004 and lock it through the safety spring pin Ref. No. 161.20.06N.	FIG. 6-1 FIG. 4-8 FIG. 4-9
5.	<input type="checkbox"/> Install the saddle subassemblies onto the track cross member, taking care to match the correct interface, depending on the range diameter.	FIG. 4-12
6.	<input type="checkbox"/> Block each saddle through the bracket Ref. No. 161.20.007 and the screws with washers Ref. No. 161.20.03N/08N.	FIG. 4-11

NOTES:

- Start positioning the saddle subassemblies in the upper part of each track.
- According to the safety requirements and procedures, command the rotation of the tracks in order to bring up other free cross members, to complete the saddle sets installation.

To remove from a track a complete set of saddles.

Step	Description	Ref.
1.	<input type="checkbox"/> Remove the screws with washers Ref. No. 161.20.03N/08N and the brackets Ref. No. 161.20.007 to free each saddle subassembly. NOTE: in this case it is not necessary to separate the pivoting part from the common base	FIG. 4-11
2.	<input type="checkbox"/> Remove the saddle subassemblies from the track cross member.	FIG. 4-12

NOTES:


- Start removing the saddle subassemblies in the upper part of each track.
- According to the safety requirements and procedures, command the rotation of the tracks in order to bring up other free cross members, to complete the saddle sets removal.

To replace the rubber pads only.

Step	Description	Ref.
1.	<input type="checkbox"/> Remove the bolt Ref. No. 1N/2N/3N and the plate Ref. No. 2 to free the rubber pads.	FIG. 6-2 FIG. 6-3 FIG. 6-4 FIG. 6-5 FIG. 6-7
2.	<input type="checkbox"/> Extract the rubber pads and replace them with new ones.	FIG. 4-7
3.	<input type="checkbox"/> Block the rubber pads through the plate Ref. No. 2 and the bolts Ref. No. 1N/2N/3N.	FIG. 6-6 FIG. 4-5

NOTES:

- Start replace the rubber pads in the upper part of each track.

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-7

- According to the safety requirements and procedures, command the rotation of the tracks in order to bring up other free cross members, to complete the rubber pads replacement.

To replace the saddle type only.

Step	Description	Ref.
1.	<input type="checkbox"/> To free the saddle from the pivoting base open the safety spring pin Ref. No. 161.20.06N and remove it. Then extract the rod Ref. No. 161.20.004.	FIG. 6-1 FIG. 4-8 FIG. 4-9
2.	<input type="checkbox"/> Remove the saddle type completed with its rubber pads.	FIG. 4-10
3.	<input type="checkbox"/> Install the required saddle type that must have been prepared with its rubber pads. Take care that the saddle locking screw are oriented on the same side of the base locking plates.	FIG. 4-10
4.	<input type="checkbox"/> To block the saddle on the support insert the rod Ref. No. 161.20.004 and lock it through the safety spring pin Ref. No. 161.20.06N.	FIG. 6-1 FIG. 4-8 FIG. 4-9

NOTES:

- Start replace the saddle type in the upper part of each track.
- According to the safety requirements and procedures, command the rotation of the tracks in order to bring up other free cross members, to complete the saddle type replacement.

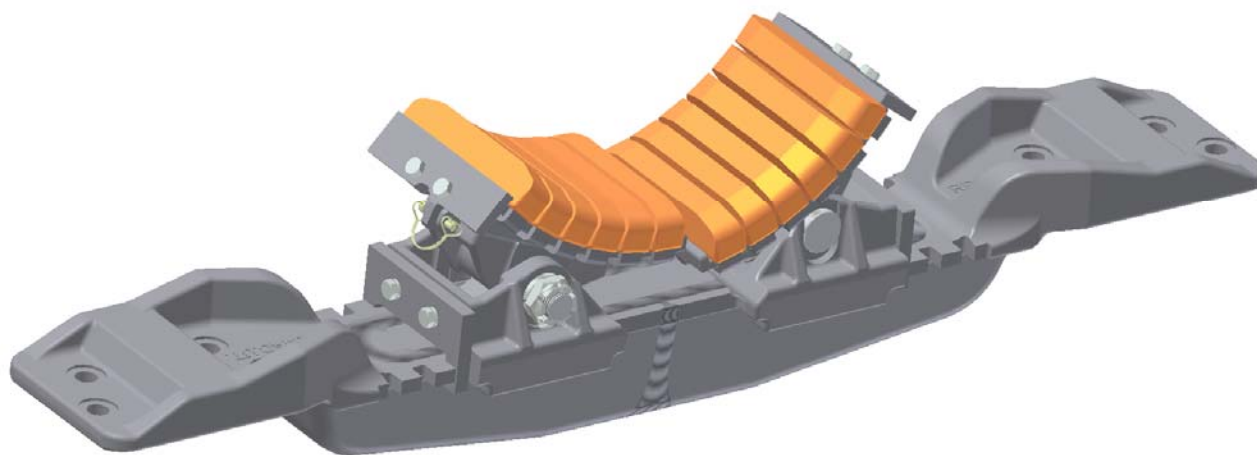



FIG. 4-6 Pivoting saddle configuration (two subassemblies per each track cross member)

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-8

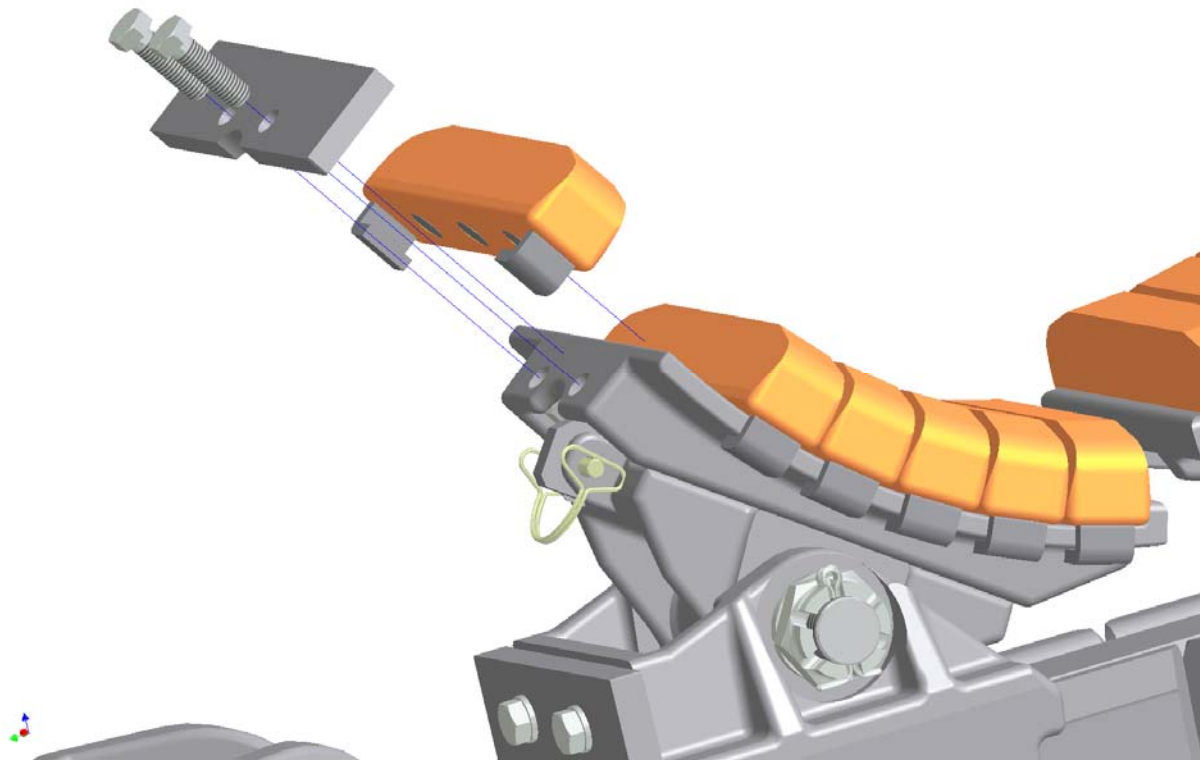


FIG. 4-7 Rubber pads installation on the pivoting saddle

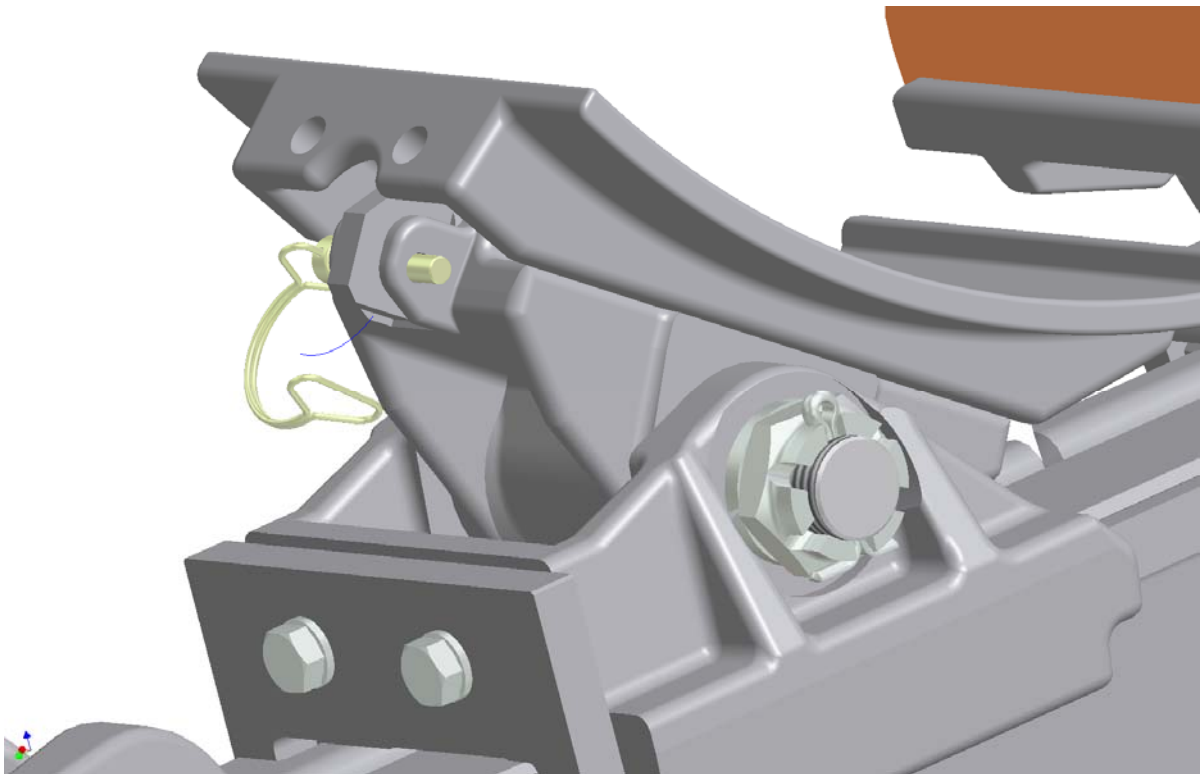



FIG. 4-8 Safety pin removal

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-9

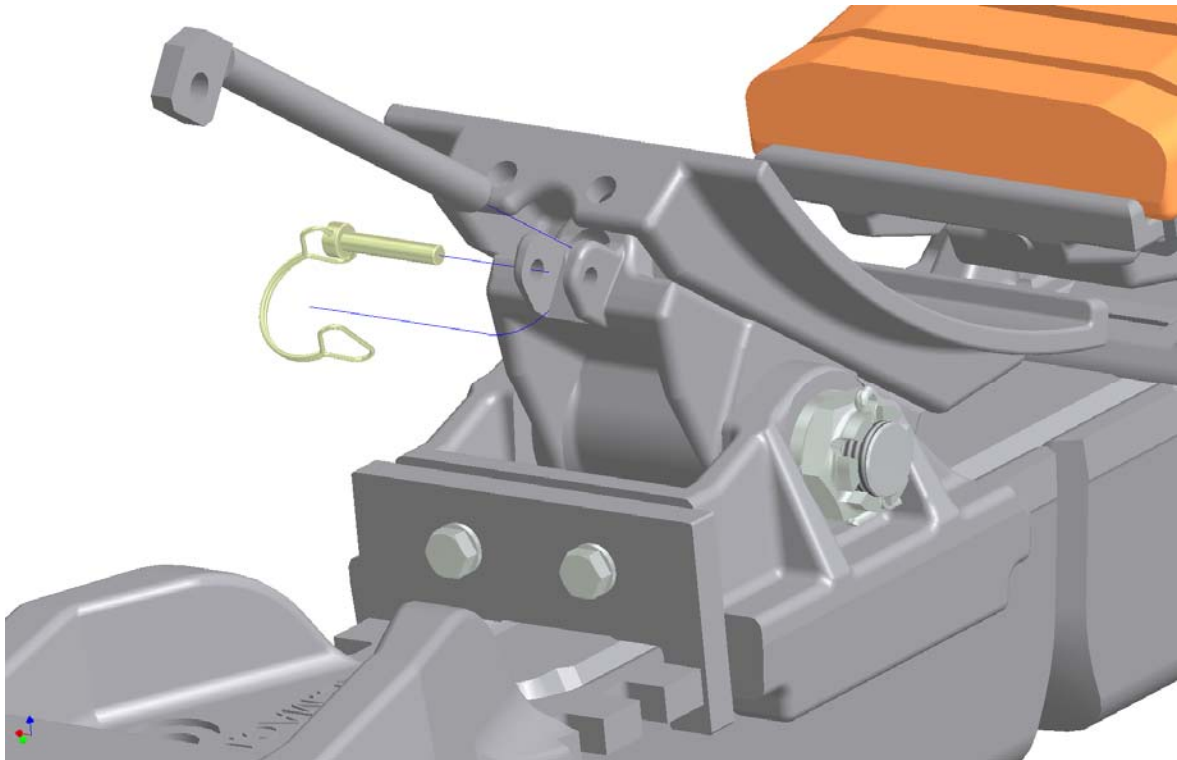


FIG. 4-9 Safety and installation pin removal

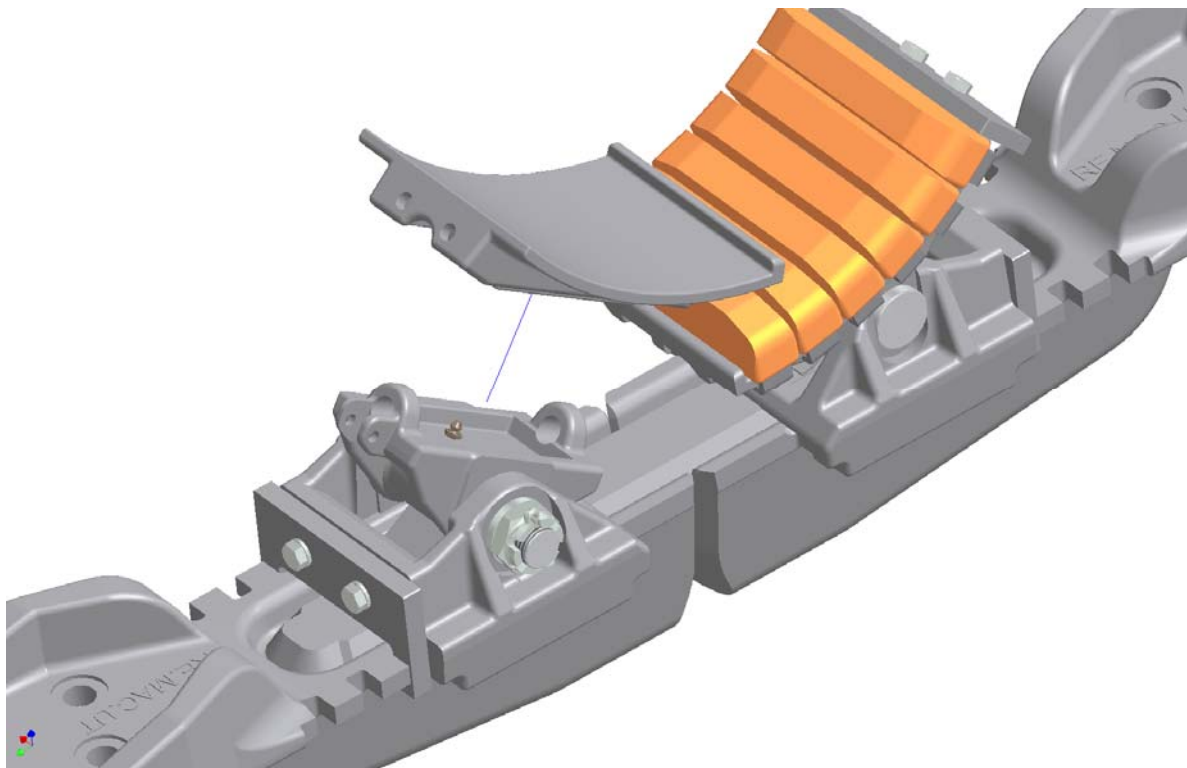



FIG. 4-10 Saddle removal from base

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	4-10

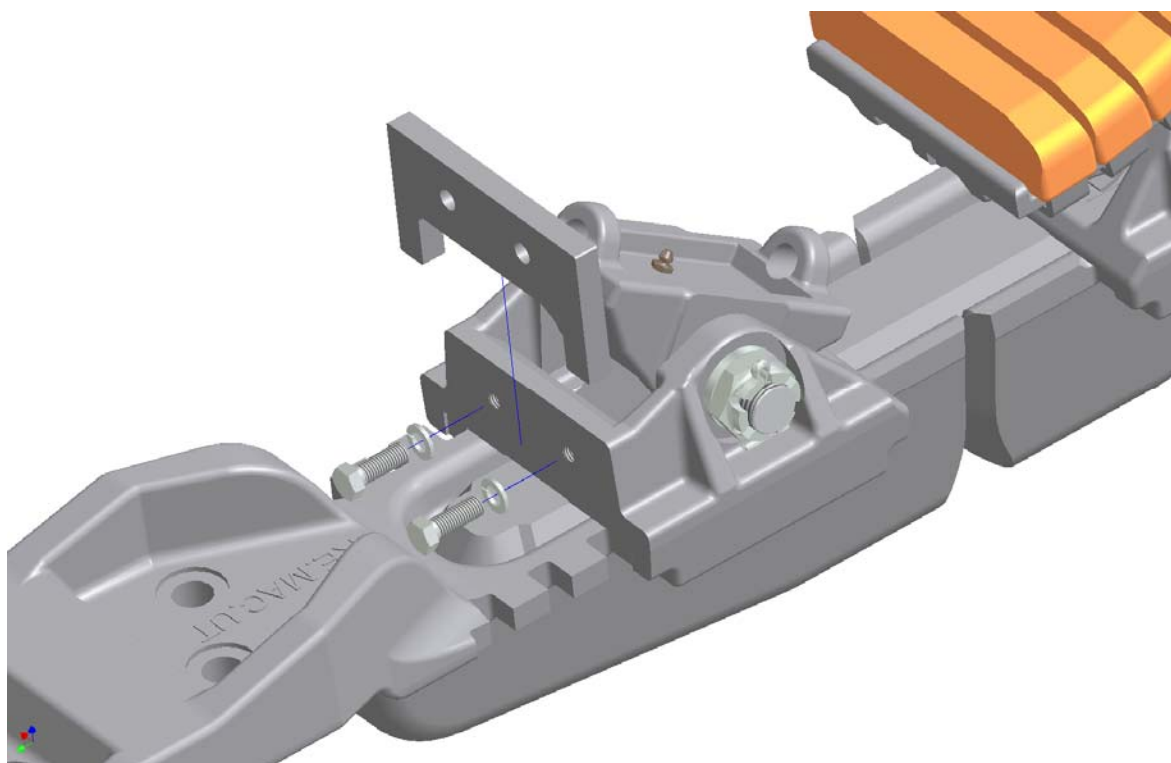


FIG. 4-11 Saddle blocking bracket removal

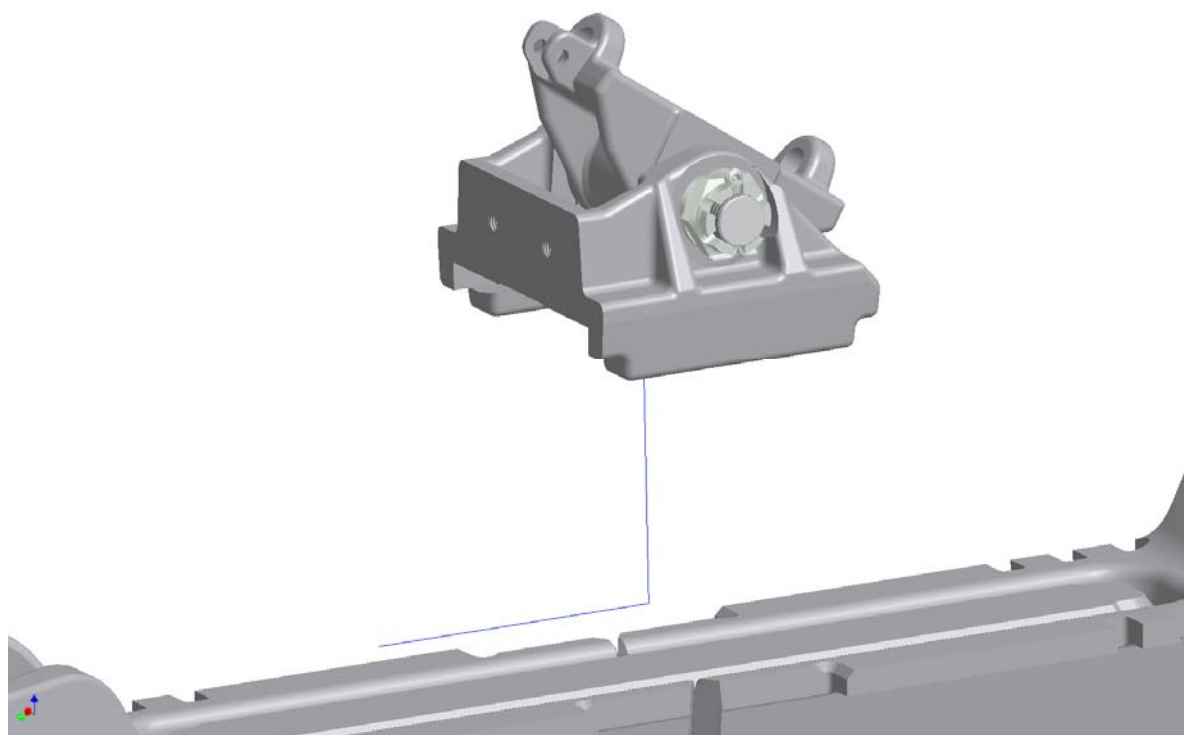



FIG. 4-12 Saddle removal from the cross member

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	5-1

5. MAINTENANCE

5.1. Ordinary maintenance

Ordinary maintenance is the performing of all those actions having the purpose to maintain the efficiency of the machine and to prevent the occurring of faults.



Before starting any kind of ordinary maintenance procedure always verify that The operators must have read and understood the particular maintenance safety warnings listed in para. 3.4.


The safety and reliability of the pipeline laying process is strictly dependant on the rubber pads integrity, because the pull load of a tensioner is obtained by the friction of the rubber pads that are squeezed against the pipe surface through the pressure exerted by the tensioner elastic suspension subassemblies.

A not uniform pressure or a not uniform friction due do partially damaged or worn pads could endanger the process.

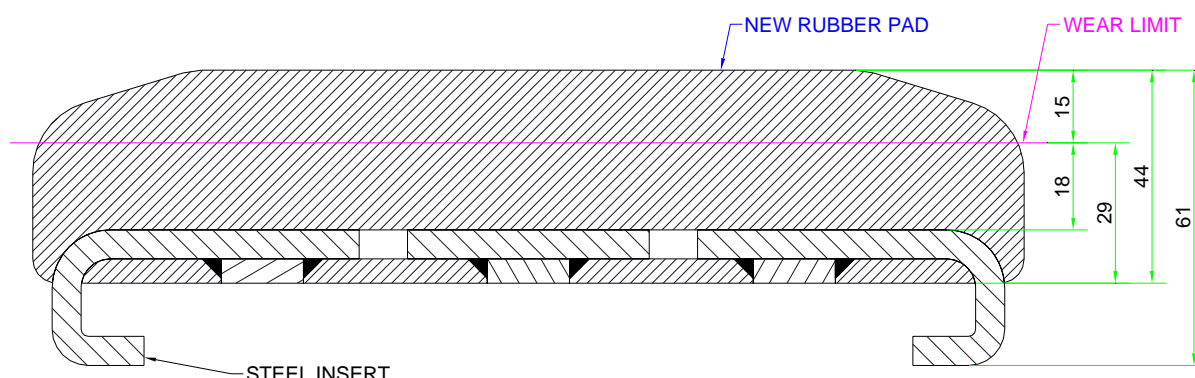
5.2. Checks

The following table summarizes the recommended periodical checks (oh = operating hours)

Subassembly	Action	Frequency
Rubber pads	<p>Visually inspect the wearing condition of the rubber pads.</p> <p>No cracks, cratering or damage to the pad surface must be accepted.</p> <p>The surface of the pad, also if worn, must be the most regular as possible.</p> <p>The height of the pad must be not less than the value specified in the next picture</p> <p>WARNING: When some rubber pads are damaged or worn it is necessary to replace the whole set.</p>	150 oh or weekly
Screws / bolts	<p>Check the tightness of the major mounting bolts and screws. Refer to paragraph 4.1 for the list of the tightening torque values to be applied to the screws and the bolts.</p> <p>A dedicated check must be performed immediately within the first two days of continuous operation, following a new installation.</p>	150 oh or weekly

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	5-2

Subassembly	Action	Frequency
Saddle structural parts	<p>Visually inspect the surfaces status.</p> <p>No rust, cracks or other kind of surface damages are acceptable.</p> <p>In case of suspected cracking replace the saddle structural parts and perform NDT checks on the removed parts (i.e. dye penetrant)</p>	150 oh or weekly



Dwg. No. 550.08.004

FIG. 5-1 – Rubber pad recommended wear limit

5.3. Cleaning

Every week check the cleaning status of the machine, with particular regards to the exposed components. If necessary perform a cleaning with pressurised air jets depending on the operational conditions.

WARNING


If a cleaning fluid is used, for local cleaning, take care to use product that do not damage the rubber parts.

No grease or lubricating oils must never be applied on the rubber pads !!

The protection of the operator against the risk of injuries due to the use of pressurized jets is to the care of the customer. It is highly recommended to wear safety glasses.

5.4. Storage

If the machine is to be kept unused for a long time, it is recommended to remove the rubber pads and store them in a wooden box, sheltered from sun and atmospheric agents. Then carefully clean the subassemblies and protect the unpainted parts using some rust preventive products as anti-oxidising oil or grease.

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	6-1

6. DRAWINGS AND PARTS LIST

The spare parts lists are shown into this section together with the subassemblies schemes. The required spare parts list must be sent to the following address:

RE.MAC.UT. S.r.l.
via Albenga, 38
10090 Cascine Vica - Rivoli (TO)
ITALY


Please always specify the required quantity of the selected items. The customer can order the single items or the whole subassemblies as spare parts.

WARNING

Each part is identified by its drawing number. This number must be used for the order of the spare parts and can be found into the parts lists of this section.

Do not confuse the reference number with the drawing number. The reference number is used into the drawing to track each part of a subassembly.

The reference number is always referred to into this document, when describing some assembling or disassembling procedure.

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	6-2

6.1. Pivoting saddle base (Dwg. No. 161.20.000)

Rev. 3 dated 14/04/08

PIVOTING SADDLE BASE – DWG.N. 161.20.000			
REF.	DWG.N.	DESCRIPTION	QT.Y
1	161.20.001	BRACKET	1
2	161.20.002	SUPPORT	1
3	161.20.003	PIN	1
4	162.10.004	PIN	1
5	161.20.005	SPRING	1
6	161.20.006	SPACER	2
7	161.20.007	PLATE	1
1N	-	BUSH AE BORG MB 40 30 DU	2
2N	-	LUBRICATOR TECALEMIT GG36-10/100	1
3N	-	ELASTIC WASHER UNI 1751 A 12 ZN	2
4N	-	ELASTIC WASHER UNI 1751 A 30 ZN	1
5N	-	HEXAGONAL NUT M30 UNI 5594 ZN	1
6N	-	SPRING PIN Dia = 8 GUALANDI 50173	1
7N	-	SPLIT PIN 6 3x50 Zinc. ISO 1234	1
8N	-	H.H. SCREW M 12x35 ISO 4017 8.8 ZN	2

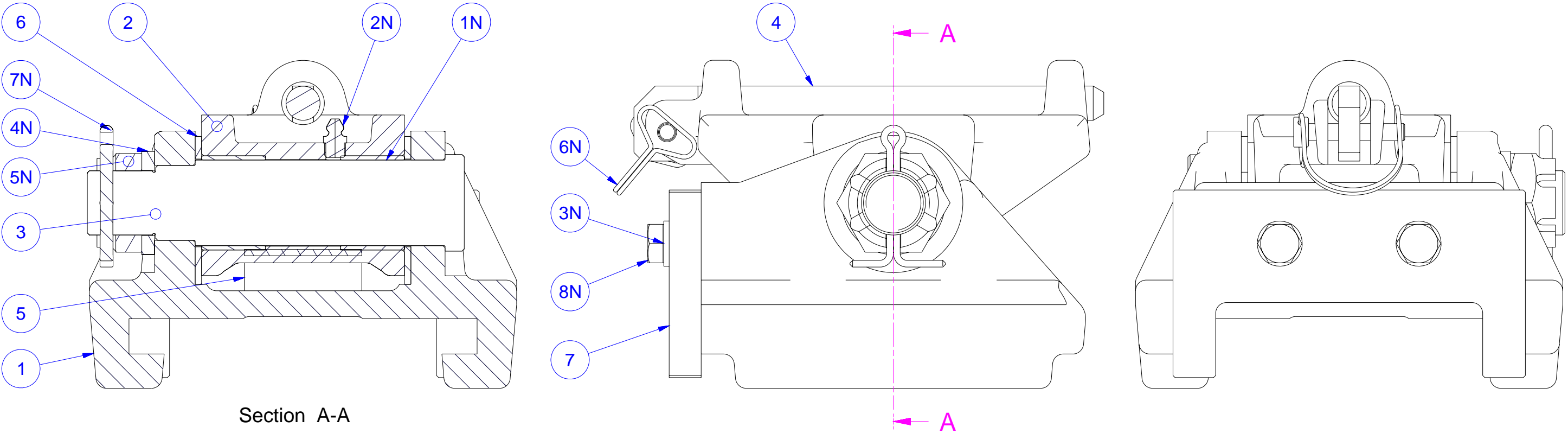



FIG. 6-1 – Pivoting saddle base (Dwg. No. 161.20.000)

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	6-4

6.2. 14"-24" Pivoting Saddle (356-610 mm pipe O.D.) (Dwg. No. 161.01.000)

Rev. 1 dated 04/12/07

14" – 24" PIVOTING SADDLE (356-610 mm PIPE O.D.) – DWG.N. 161.01.000			
REF.	DWG. N.	DESCRIPTION	Q.TY
1	161.01.001	SADDLE	1
2	161.01.002	PLATE FIXING PADS	1
3	550.08.004	RUBBER PAD	6
1N	-	ELASTIC WASHER UNI 1751 A 12 ZN	2
2N	-	HEXAGONAL NUT M12 ISO 4032 8 ZN	2
3N	-	H.H. SCREW M 12x40 ISO 4017 8.8 ZN	2

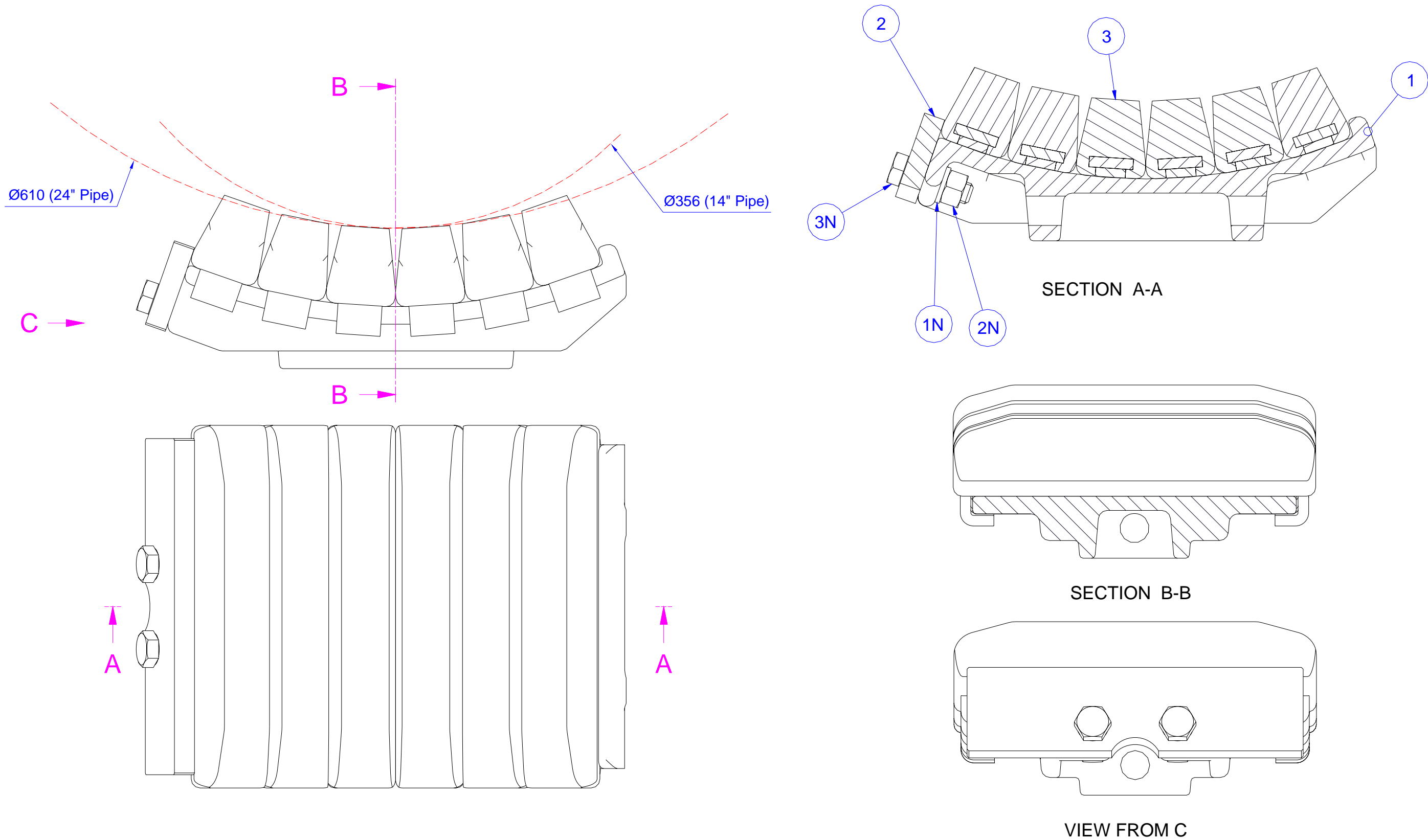



FIG. 6-2 – 14''-24'' Pivoting saddle (Dwg. No. 161.01.000)

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	6-6

6.3. 24"-32" Pivoting Saddle (609-813 mm pipe O.D.) (Dwg. No. 161.02.000)

Rev. 1 dated 04/12/07

24" – 32" PIVOTING SADDLE (609-813 mm PIPE O.D.) – DWG.N. 161.02.000			
REF.	DWG. N.	DESCRIPTION	Q.TY
1	161.02.001	SADDLE	1
2	161.01.002	PLATE FIXING PADS	1
3	550.08.004	RUBBER PAD	7
1N	-	ELASTIC WASHER UNI 1751 A 12 ZN	2
2N	-	HEXAGONAL NUT M12 ISO 4032 8 ZN	2
3N	-	H.H. SCREW M 12x40 ISO 4017 8.8 ZN	2

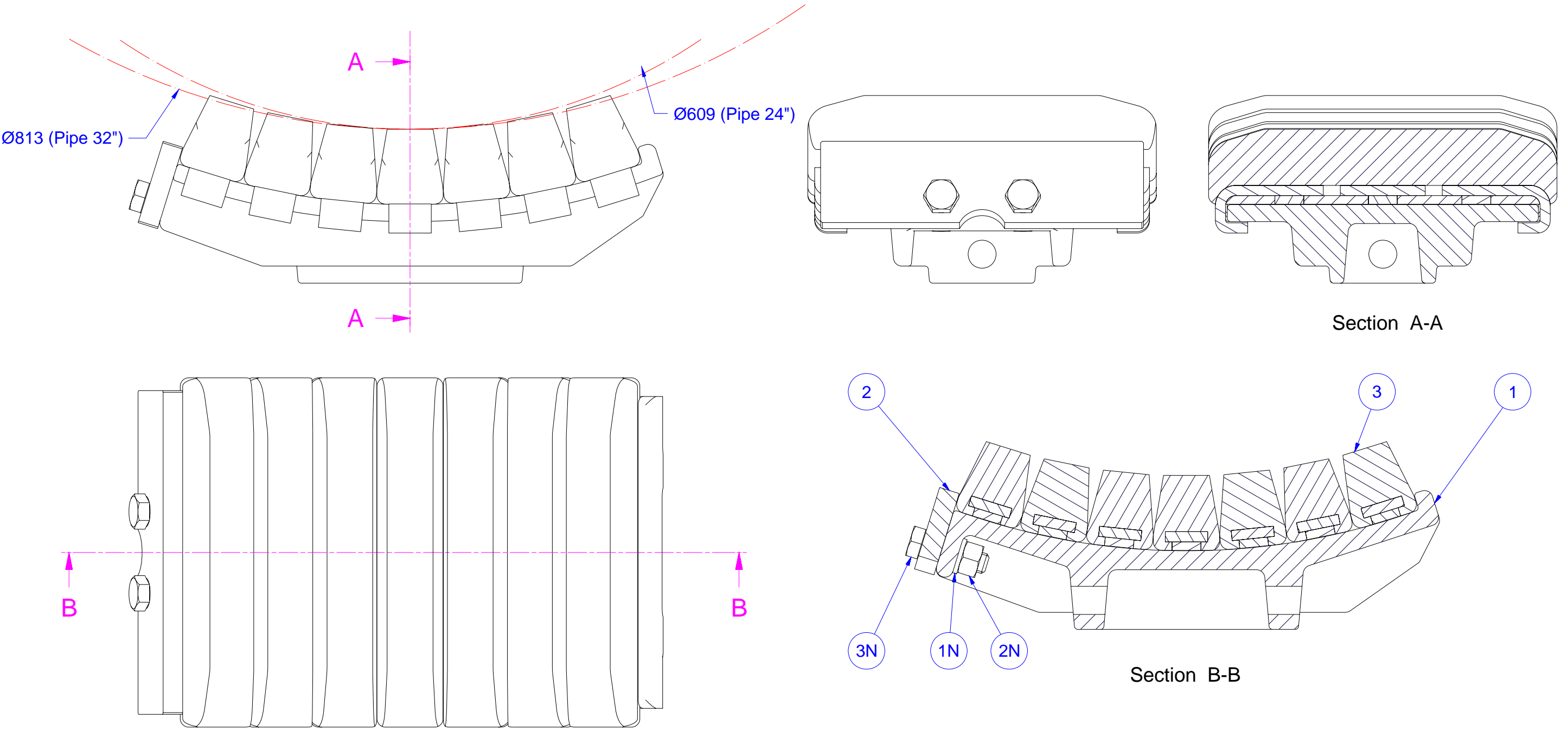



FIG. 6-3 – 24''-32'' Pivoting saddle (Dwg. No. 161.02.000)

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	6-8

6.4. 32"-46" Pivoting Saddle (810-1170 mm pipe O.D.) (Dwg. No. 161.03.000)

Rev. 1 dated 05/12/07

32" – 46" PIVOTING SADDLE (810-1170 mm PIPE O.D.) – DWG.N. 161.03.000			
REF.	DWG. N.	DESCRIPTION	Q.TY
1	161.03.001	SADDLE	1
2	161.01.002	PLATE FIXING PADS	1
3	550.08.004	RUBBER PAD	7
1N	-	ELASTIC WASHER UNI 1751 A 12 ZN	2
2N	-	HEX. NUT M12 ISO 4032 8 ZN	2
3N	-	H. H. SCREW M12x40 ISO 4017 8.8 ZN	2

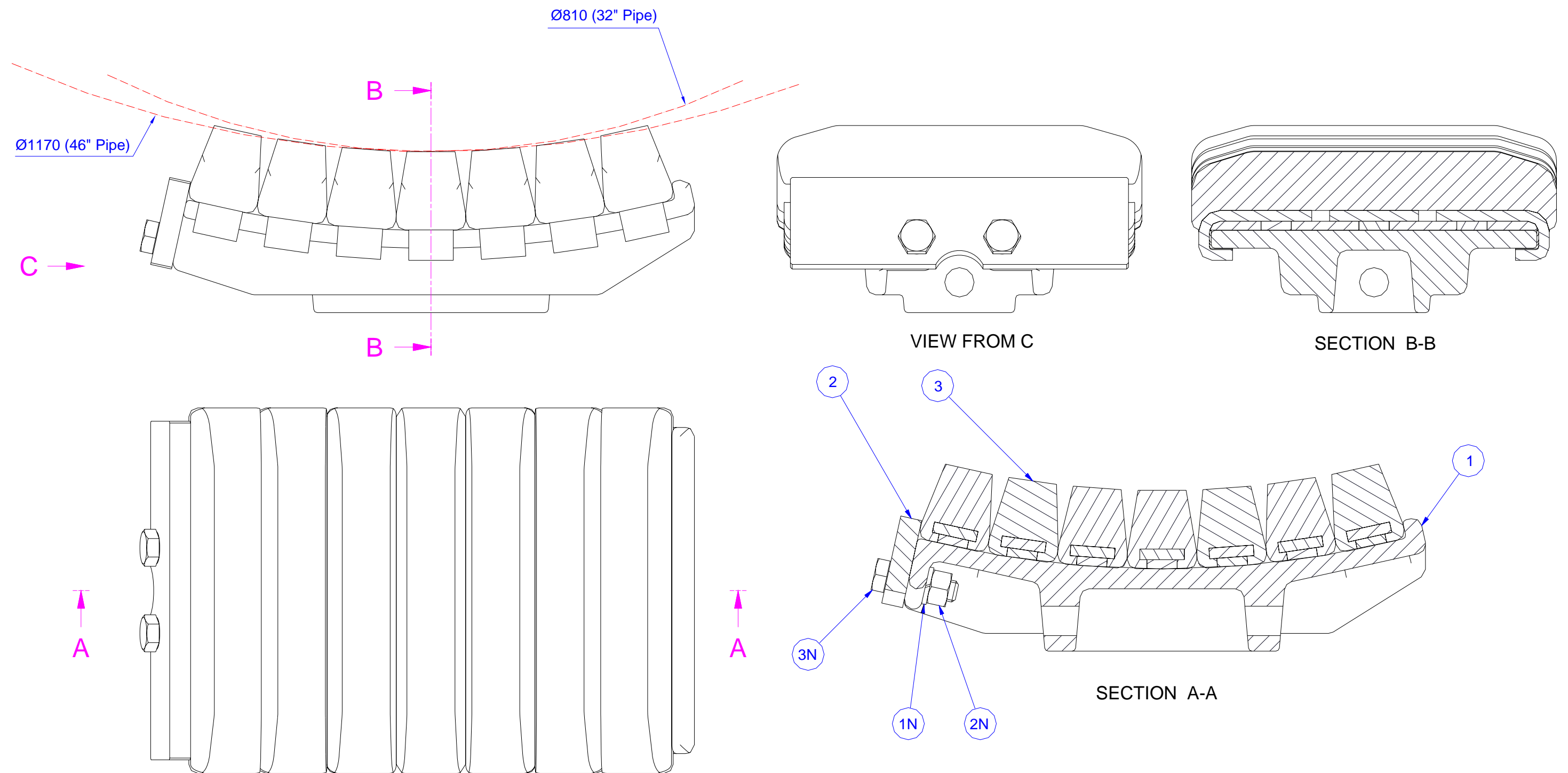



FIG. 6-4 – 32''-46'' Pivoting saddle (Dwg. No. 161.03.000)

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	6-10

6.5. 32"-60" Pivoting Saddle (810-1524 mm pipe O.D.) (Dwg. No. 161.04.000)

Rev. 1 dated 05/12/07

32" – 60" PIVOTING SADDLE (810-1524 mm PIPE O.D.) – DWG.N. 161.04.000			
REF.	DWG. N.	DESCRIPTION	Q.TY
1	161.04.001	SADDLE	1
2	161.01.002	PLATE FIXING PAD	1
3	550.08.004	RUBBER PAD	8
1N	-	ELASTIC WASHER UNI 1751 A 12 ZN	2
2N	-	HEXAGONAL NUT M12 ISO 4032 8 ZN	2
3N	-	H.H. SCREW M 12x40 ISO 4017 8.8 ZN	2

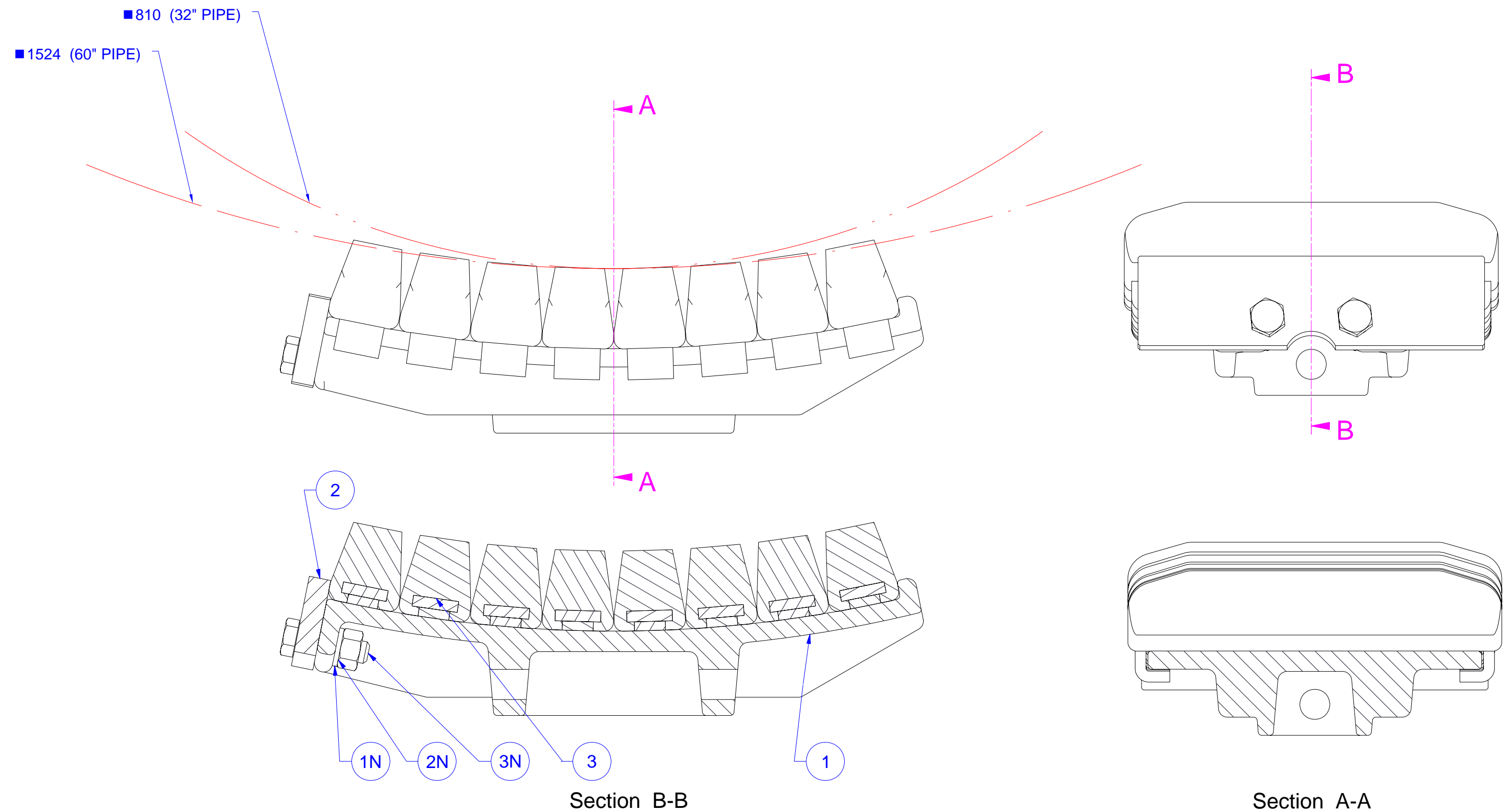



FIG. 6-5 – 32”-60” Pivoting saddle (Dwg. No. 161.04.000)

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	6-12

6.6. 4"-14" Fixed Saddle (101-356 mm pipe O.D.) (Dwg. No. 161.05.000)

Rev. 1 dated 06/12/07

4" – 14" FIXED SADDLE (101-356 mm PIPE O.D.) – DWG.N. 161.05.000			
REF.	DWG. N.	DESCRIPTION	Q.TY
1	161.05.001	SADDLE STRUCTURE	1
2	161.05.002	BRACKET	2
3	161.05.003	FIXING PADS	1
4	550.08.004	RUBBER PADS	7
01N	-	H.H. SCREW M 12x40 ISO 4017 8.8 ZN	2
02N	-	ELASTIC WASHER UNI 1751 A 12 ZN	6
03N	-	H.H. SCREW M 12x50 ISO 4017 8.8 ZN	4

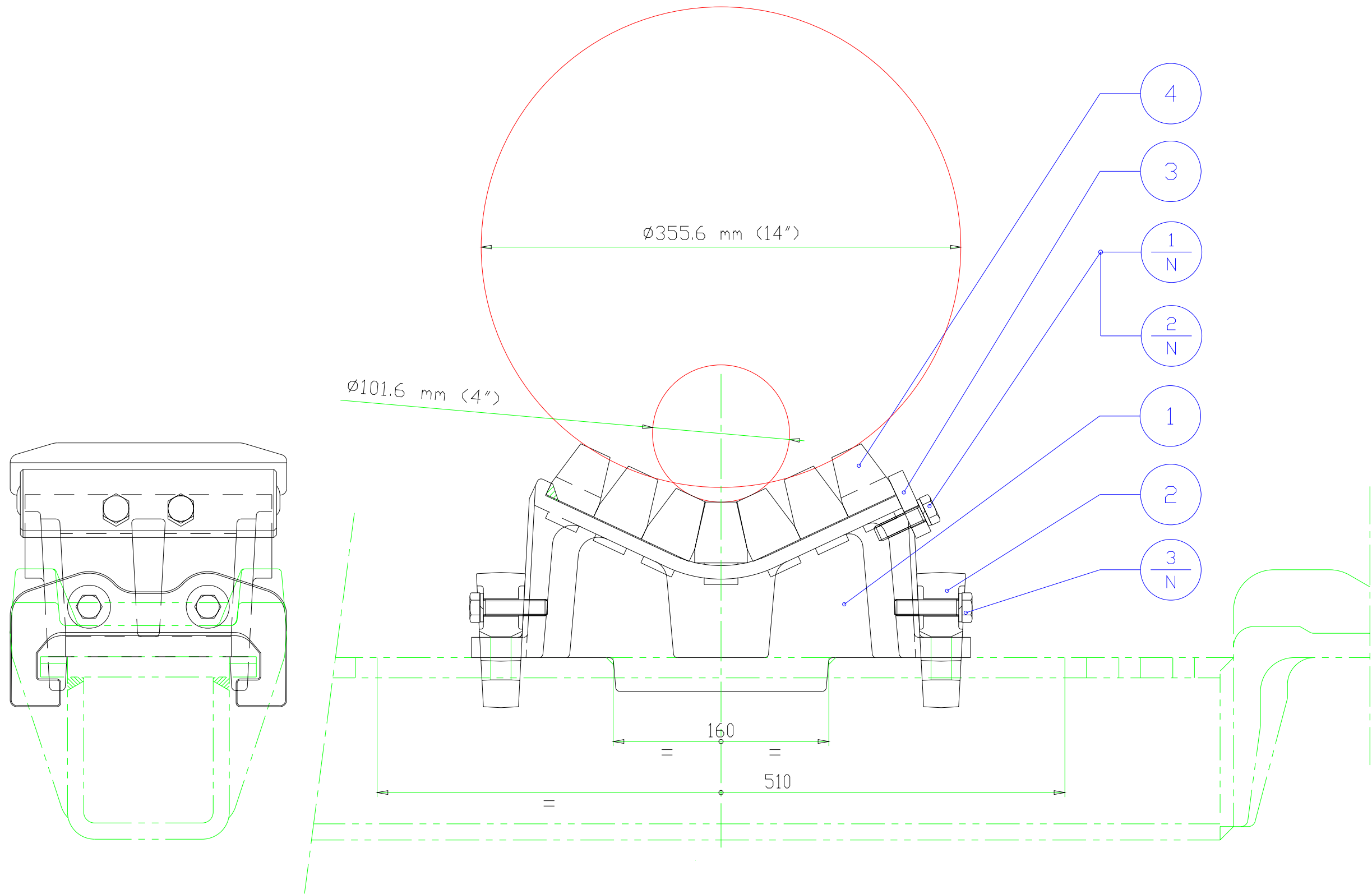



FIG. 6-6 – 4'-14" Fixed saddle (Dwg. No. 161.05.000)

	LOGO CERTIFICATO QUALITA'	Standard Pivoting and Fixed Saddles for Pipe Tensioners Chain Pitch 215,9 mm	Doc N.:	161-IOM-en
			Rev. N.:	0
			Rev. Date:	12/10/2008
			Page N.:	6-14

6.7. 16"-30" Pivoting Saddle (407-762 mm pipe O.D.) (Dwg. No. 161.06.000)

Rev. 1 dated 06/12/07

16" – 30" PIVOTING SADDLE (407-762 mm PIPE O.D.) – DWG.N. 161.06.000			
REF.	DWG. N.	DESCRIPTION	Q.TY
1	161.06.001	SADDLE	1
2	161.01.002	PLATE FIXING PADS	1
3	550.08.004	RUBBER PAD	6
1N	-	ELASTIC WASHER UNI 1751 A 12 ZN	2
2N	-	H.H. SCREW M 12x40 ISO 4017 8.8 ZN	2
3N	-	HEXAGON NUT M 12 ISO 4032 8 ZN	2

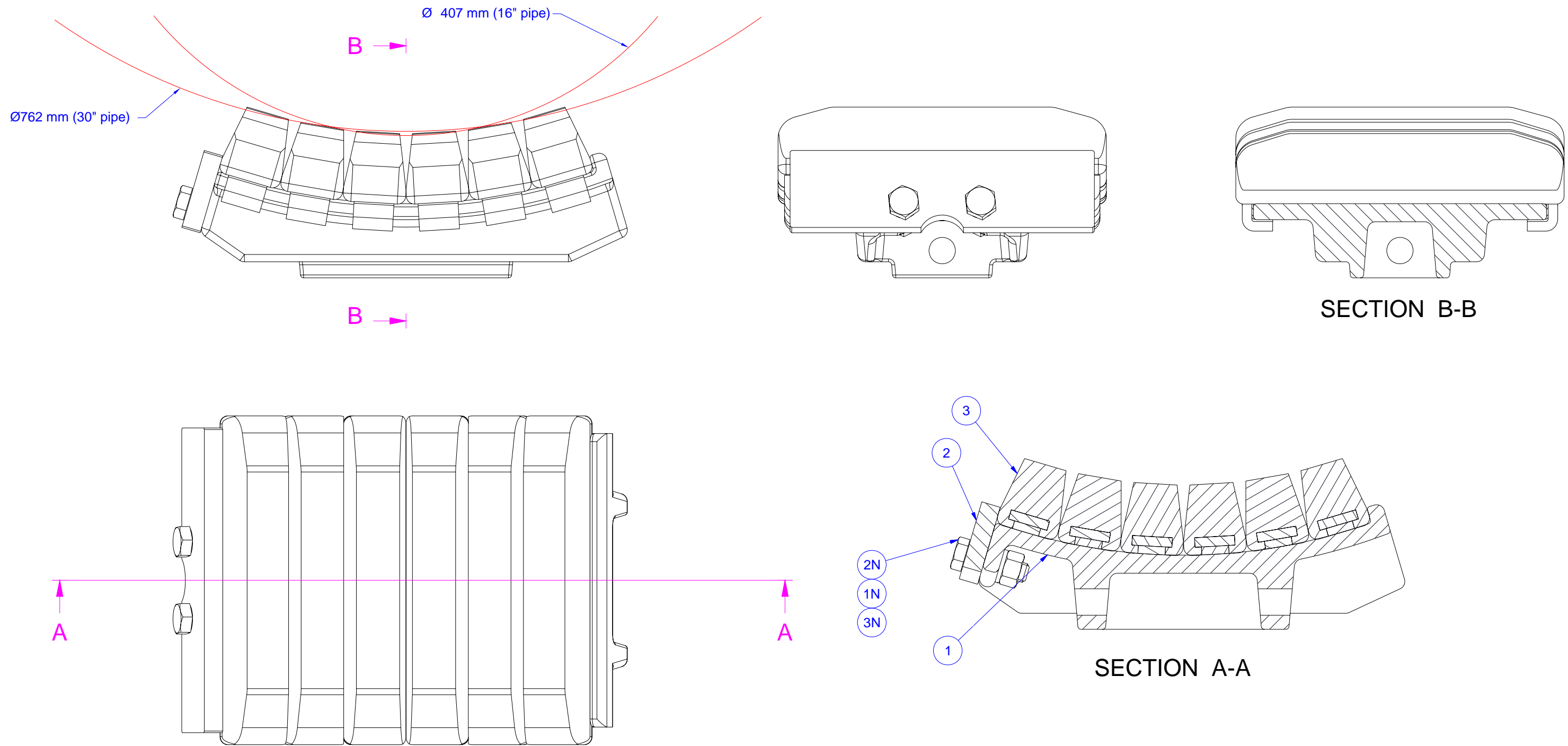


FIG. 6-7 – 16'-30" Pivoting saddle (Dwg. No. 161.06.000)