WITHOUT compromise

Without Compromise is published by
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Fassi Gru international magazine with information and updates

MADE FOR YOU

FASSI

CRANES WITHOUT COMPROMISE

MADE FOR YOU

FASSI OFFERS THE "IDEAL" CRANE

ONLY A CRANE THAT MEETS THE CUSTOMER'S NEEDS EXACTLY CAN TRULY BE CONSIDERED IDEAL

Going beyond the concept of customisation to give even more: precisely that, the "ideal" crane, designed and made to the specific requirements of each user. With Fassi, achieving this goal becomes possible, thanks to an almost limitless series of synergies between models, versions, configurations and accessories.

In over forty years of business history, it can truly be said that all Fassi cranes have been made to measure: this is the result of the "Made for you" philosophy, which has made known and been the success of a whole new concept of range and opportunity, one that overcomes all barriers, in perfect harmony with the expectations of each individual customer and user. On the contrary, what remains absolutely unchanged in each Fassi product, leaving to one side the choices that make up the ideal crane, is their commitment to quality. Today, as in the past, Fassi designs, builds, tests and controls each crane it makes directly within the company, through a carefully planned, exclusive engineering and construction process: the "Made in Fassi" process, certain particularly interesting aspects of which we will be looking at in this issue of the magazine. And above all it is from application of this method that cranes with no-compromise, no comparison technical and quality characteristics are born. A method that starts from the choice of steel and the metalworking operations.

FASSI CRANES WITHOUT COMPROMISE

MADE FOR YOU

OVER 500 VERSIONS THAT CAN BE CONFIGURED AS REQUIRED, FOR CRANES THAT RESPOND PERFECTLY TO YOUR SPECIFIC NEEDS

Fassi's "made to measure" concept starts from over 30,000 configurations of crane, which are ready to be further customised using technological solutions that make them truly unique machines. Over 60 different models, in a variety of versions, with the highest level of innovation in the sector.

MADE IN FASSI

EACH FASSI CRANE IS ENTIRELY DESIGNED, BUILT AND TESTED IN ITALY, BY THE MANUFACTURER

A bonus that distinguishes and qualifies Fassi at world-wide level: the whole crane is born in our factory. This choice is both a characteristic and an obligation, and on its own is sufficient to underline how much passion the Fassi team puts into its work, and how proud they are of the results achieved. Seriousness and reliability that goes from the basic machining operations down to the smallest details and to the tests carried out, which all have to follow a specific protocol.

in this number

MADE FO

EACH FASSI CRANE IS CONFIGURED ACCORDING TO CUSTOMER REQUESTS

OR YOU

The Fassi range is the widest in the world of vehicle-mounted articulated cranes. Over 60 models available in a multitude of versions, from micro cranes to giants of over 150 t/m. There are over 30,000 available configurations, which can be formulated according to the needs and expectations of the user. If we then go on to add the many available accessories, this gives a selection of opportunities that result in a crane that complies exactly with the working needs it will be required to cover. But Fassi does not stop there: an important part of the modularity, versatility and infinite extent of the range is actually made up of the new opportunities provided by recent technological inventions, applied to cranes. In this case, electronics is the absolute protagonist. Fassi "Made for you" is, in certain aspects, comparable with what is now offered by the most modern cars, which give customers the advantage of "building" a car to suit them, both in terms of configuration and in the optional accessories. Some might fear that this impressive range of choices might result in confusion. Don't worry: Fassi has developed a special software for its sales network, with the aim of guiding customers in their choice of the ideal solution.

MADE IN FASSI

EVERYTHING IN A FASSI IS DESIGNED AND TESTED IN ITALY, INSIDE THE COMPANY

In this number of our magazine we will concentrate on the choice and processing of steel, casting and welding.

Over 90% of a Fassi crane is born directly within Fassi itself. The remaining 10%, mainly made up of hydraulic valves and distributors, is the result of original Fassi projects, developed in close co-operation with the best specialist manufacturers in the world. Each Fassi crane is the result of all-Italian commitment and work, fruit of the abilities and resources of 6 companies and 11 factories located throughout the country. The Fassi group is organised to cover the entire manufacturing cycle without outside assistance. Specialist departments deal with heavy structural elements, steel-working, with laser cutting of the steel plates and robot control-led welding, mechanical machining operations, casting and construction of extensions. Other departments are in charge of the construction of rams and outriggers. A network of expe-rience, ability and professionalism, which all refers to a unique and specific production model, which takes the form of a carefully planned process that deserves recognition. So let us start in this number on a trip along the Fassi manufacturing process, concentrating ourselves on the choice and processing of raw materials.


FASSI
APPROVED - APPROVED - APPROVED - APPROVED - APPROVED
OKFASSI

"Fassi approved" manufacturing processes

A trip along the casting and welding cycle

Among the characteristics that distinguish a Fassi crane on the market there is certainly a special commitment to quality in every technological and constructional aspect, which takes concrete form in machining processes that are perfected directly within the company. These are the fruit of exclusive know-how from the sector, and the results are only approved if they comply with the severe expectations set for each phase. Among the fundamental points in this commitment is the choice and processing of metals, and in particular special steels, which are selected and processed so as to form a true production cycle, with levels of excellence that deserve to be more widely known (see the feature on pages 20 - 23). Let us now take a look at some of the attention dedicated by Fassi to metals, as they are gradually transformed from "raw material" into a crane: casting and welding processes, bearing in mind that these too are required to comply with precise and extremely strict quality parameters, rigorously tested and checked, so that each individual piece is "approved" by Fassi.

Casting of bases and columns

The crane bases and columns is an excellent example of how Fassi approval is applied and what it involves. Cast elements are made from special steel and cast iron, and many have extremely high mechanical characteristics, comparable with those of metal sheets with high elastic limits. The majority of the alloys used in casting are defined directly by Fassi, in co-operation with specialists in these processes. The entire casting system of potential suppliers is analysed by Fassi technicians, and only if considered capable of respecting and providing a long term guarantee for specifications, in terms of all casting characteristics (chemical, mechanical tenacity, health and safety..) will the foundry be "Fassi approved". Fassi's know-how is also of fundamental importance to discriminate between, and thus provide an objective evaluation of, the methods used by the supplier, from casting procedures to forming (empty form created from sand/resin which is filled with the molten metal during the casting process), to the various finishing operations, to heat treatment and non-destructive and laboratory testing. According to the methods used the results obtained may be quite different, and over the years Fassi has identified and perfected which of these parameters are ideal. Again bearing in mind that excellence means first of all preventing the faults typical of casting (such as cracks, inclusion of foreign bodies, shrinkage, bubbles…), the processes are approved casting by casting, with an extremely wide-ranging series of tests. These start from sectioning of pro-

TREATING - Once the steel casting (in the case of cast iron the process is different) has been broken out of the mould and flogged, it is freed from the feedheads and casting channels and subjected to an annealing process. At this point the non destructive tests on each individual raw component begin: using magnetic particles, penetrating fluids, ultrasound and X-ray. After any repairs (only foreseen for steel castings) the raw component is then subjected to thermal treatment cycles, which may be for normalisation or tempering and hardening, to give the piece the mechanical characteristics and resistance required by Fassi specifications. After these operations, final tests are carried out both on the pieces and on the samples. The samples are normally tail elements that are cast with the pieces, and therefore undergo the same cycle. At the end these tail elements are cut away from the casting, and the samples taken in this way are used to carry out the traction, resilience and metal analysis tests to ensure that the material complies with the necessary specifications.

totypes and continue with a range of non destructive tests (control using magnetic particles, penetrating fluids, ultrasound, rays) in search of possible internal and surface faults. It then proceeds with analysis of material characteristics (chemical analysis, metal analysis, hardness tests, traction tests, resilience tests…). Each single casting is only approved if all the test results comply with Fassi specifications. All this commitment is justified by the target that Fassi has set itself: using monolithic cast components it is possible to obtain the ideally shaped base, column and other components, according to the stress to which the crane will be subjected. This makes it possible to achieve levels of reliability, particularly in the long term, that would be impossible using welded components. This is why Fassi has adopted cast elements in almost all its products.

The welding process

It is clear that the characteristics and end quality of welding operations also depend first of all from the materials to be welded together: this is why Fassi makes a careful selection of the suppliers of special steels. The secret of a perfect weld then depends on setting the process parameters exactly: Fassi uses a continuous semiautomatic, automatic and robot controlled "mig mag" gas arc-welding process (using active-inert gas) which, because of the types of material and thicknesses involved, reduces the faults typically found in other types of welding processes. All those machining operations and actions carried out before welding, such as preparation of the parts and study and creation of specific equipment and systems to position and lock the edges to be joined, also fall within the company's range of activities. Equally important is the choice and definition of welding parameters, such as electrical parameters (volts, amps), the speed of advance of the welding torch and the solder, the movement of the torch, the distance between the torch and the piece. But equally important are the gas type and flow rate, and the type of solder used, according to the materials to be joined and the type of joint. The delicate nature of this process and the exclusiveness of the Fassi procedure lies in setting out all these parameters, on which the end result depends, in the ideal way. It is also of fundamental importance for specialist technicians to carry out inspections during the operation, to ensure that the parameters set in the procedures are complied with and to carry out non destructive and laboratory tests for continuous process monitoring. The aim is to guarantee the required quality in terms of the shape, size, resistance and tenacity of each joint.

WELDING - In Fassi, welding is mainly carried out using very high technology automatic and robot controlled systems, capable of ensuring perfect replication of the parameters foreseen by the process. Whether it is done by a robot or by a specialist welder, they are still an integral part of the Fassi "approval" process. This means that both the technicians programming and managing the systems and the welders themselves are suitably trained and qualified to comply with the process requirements that characterise work here in Fassi, whatever the conditions.

Fassi hydraulic jibs

A complete range for cranes: from 6 to 150 tons/metre, up to 35 metres

First of all, we must remember that a hydraulic jib is a third boom that can be added to the standard machine using a special coupling device. In view of the importance that these jibs have for operation of a crane, Fassi has dedicated great attention to this element, designing and creating the jibs with the same quality principles employed on all its models, testing the jibs with the same meticulous tests and fatigue tests used for the cranes themselves.

A range for every need

The first factor that must be underlined is the extent of the range provided by Fassi: there are jibs that can be fitted on cranes of from 6 to 150 t/m, with working capacities of up to 35 metres. This means it is possible to have jibs that are suitable for the majority of models and working versions of Fassi crane, particularly in the range preferred by the majority of users.

Working dimensions reduced to a minimum

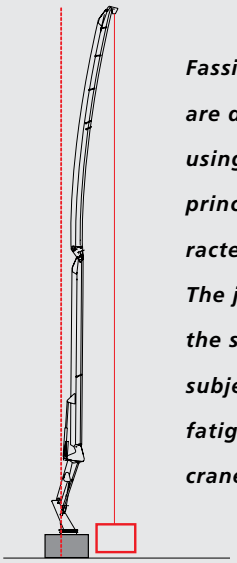
The care used when designing Fassi products can also be seen in various technical and structure features of the jibs. One that stands out in particular is the fact that all Fassi jibs, as well as being able to fold away behind the cab, are designed so that their working dimensions are as small as possible, thus leaving the maximum amount of usable loading space on the truck bed. Furthermore, Fassi has designed its jibs so as to reduce the encumberment height of the jib itself. The result has been achieved by fitting the rams to the sides of the jib.

High speed and excellent performance

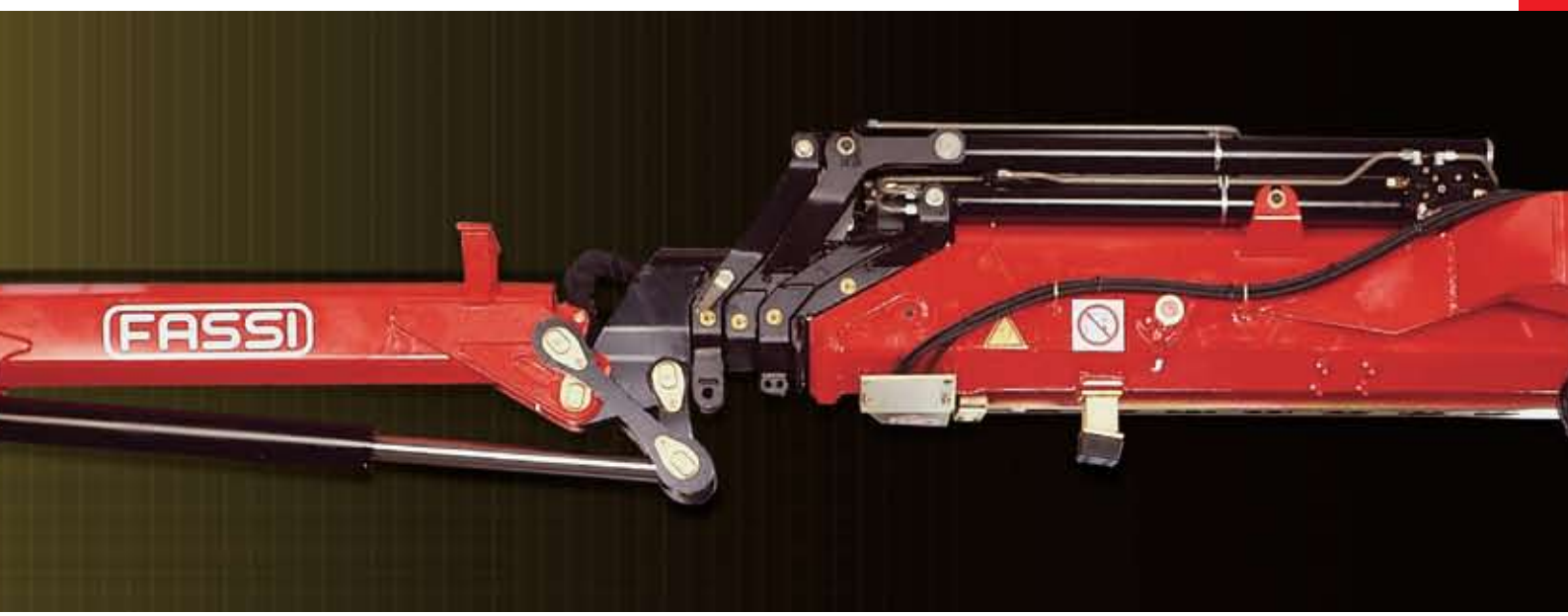
One of the strong points of Fassi jibs is their speed. In effect, they are all fitted with regenerating valves, which allow the best possible performance in all working conditions. Fitting a Fassi jib will not restrict the performance of your crane, with the obvious exception of the changes in rated capacity resulting from the additional weight of the jib itself.

Total working safety

In Fassi cranes even the jibs are fitted with lifting moment limiting device, integrated with the machine's on-board electronics. Fassi jibs also have a special system for automatic hook-up of the extending booms when the crane is folded away. This is an extremely useful safety device when working on rough or bumpy ground, which might result in a risk of partial extension of the jib while the truck is in motion.



Fassi hydraulic jibs are designed and built using the same quality principles that characterise all our cranes. The jibs are tested in the same way and are subjected to the same fatigue tests as the cranes themselves.



Integration of functions

In Fassi jibs there is no lack of synergism with the other additional systems: this is why the jibs can be fitted with raceways to activate supplementary devices at the tip of the jib, such as rotators, buckets, hydraulic hooks, etc..

Over 30,000 configurations

The widest range of any crane manufacturers, from micro cranes to the F1500AXP, to special models

For Fassi, creating a new crane is the result of careful design and prototype preparation, testing and controls, which may take over two years from the original idea to the start of production. A new model is always added to the existing range for technical and performance reasons, in order to provide additional advantages for the users, according to our philosophy of a new crane "without compromise". Thus, the extent of the range is once again based on "quality": each Fassi crane has a precise reason for existing, and forms part of the "Made for you" philosophy.

LIGHT-DUTY CRANES

Particular attention is given to the design and production of cranes with a lifting capacity of between 2 and 11 t/m, bearing in mind the growing market needs and the use of these machines. Fassi light-weight cranes, which are also available in a wide range of versions, starting from "micro" cranes, combine reduced weight, compactness and limited dimensions, but without foregoing all those factors typical of Fassi quality, both in the structure and in the details. These light-weight cranes mean that you can have Fassi quality even on light-weight trucks, even 3.5 TM (total mass) trucks that can be driven with a normal driving license.

MEDIUM-DUTY CRANES

From 13 t/m upwards we enter the realm of medium capacity cranes, which provide performance but at the same time are extremely dynamic. The Fassi production range includes machines that start from model F130A and go all the way up to model F360DXP (36 t/m), suitable to be fitted on two- and three-axle trucks, in a variety of setups. The technological fittings include all the most innovative electronic, hydraulic and mechanical components. Not without reason, most Fassi medium range cranes form part of the "Evolution" range, and are therefore fitted with devices that are state-of-the-art in terms of both performance and safety. To this must be added the availability of the Prolink function and a rich series of additional accessories and devices.

HEAVY-DUTY CRANES

Fassi has revolutionised the traditional idea of heavy-weight crane, to be installed on 3 or 4-axle trucks. Starting from model F380B and all the way up to the imposing F1500AXP, these cranes stand out for their ability to combine exceptional lifting performance with a machine body that reduces structural dimensions to a minimum and aims at limiting tare weight. This is possible thanks to the use of special materials, first among which are the extremely high elasticity steels which, while they ensure formidable levels of resistance, also make it possible to optimise weight. This is why Fassi is able to offer a crane "without compromise" like the F1500AXP. Naturally, particular care is given to reliability, although this has to be reconciled with dynamics, which are an integral part of the very concept of hydraulic cranes.

THE RANGE OF FASSI SPECIAL CRANES

XS SERIE
Hydraulic cranes designed to ensure high dynamics for frequent, intense or continuous operation. They are particularly suitable for municipal businesses and in the ecology and water-gas maintenance sector.

AS SERIE
The technological and working answer for movement and delivery of material on pallets. Particularly appreciated by logistics organisations and building material distributors.

SE SERIE
Cranes designed specifically to provide a suitable technological answer for civil engineering contractors dealing with the installation/sale of "dry walls".

T SERIE
Cranes particularly suitable for breakdown and vehicle removal services, in which it is necessary to lift vehicles.

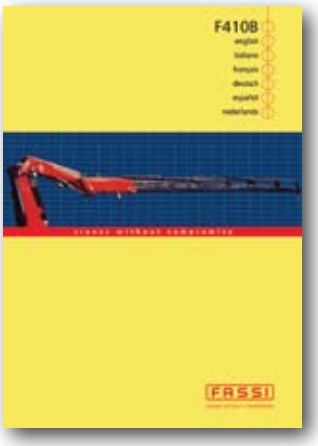
MARINE SERIE
A specific series of cranes for marine environments. Thanks to the specially made base, installation of the winch and the protection against salt, these can be fitted on any type of cargo, fishing or leisure vessel.

DEFENCE SERIE
For over forty years, Fassi has been working with the armed forces of numerous Countries. This experience has resulted in a specific series of cranes, which are designed to be integrated with many types of military vehicle and equipment.

RAILWAY SERIE
Cranes specifically designed to be fitted on railway trucks, suitable for line maintenance.

A RANGE IN CONSTANT EVOLUTION, EVEN IN THE CATALOGUES

THE "PREVIEW" CATALOGUE



The design, production and introduction to the market of a new Fassi crane is the result of an engineering and technical-production plan that is developed over a period of at least 12 months. However, it is necessary to inform the market in advance of the new entry, so as to activate the sales line and make the new crane known to customers. This is why Fassi produces a "preview" catalogue for the models it is about to bring out, with an unmistakable yellow cover, containing the main technological and working features of the new crane.

THE "PRODUCTION" CATALOGUE

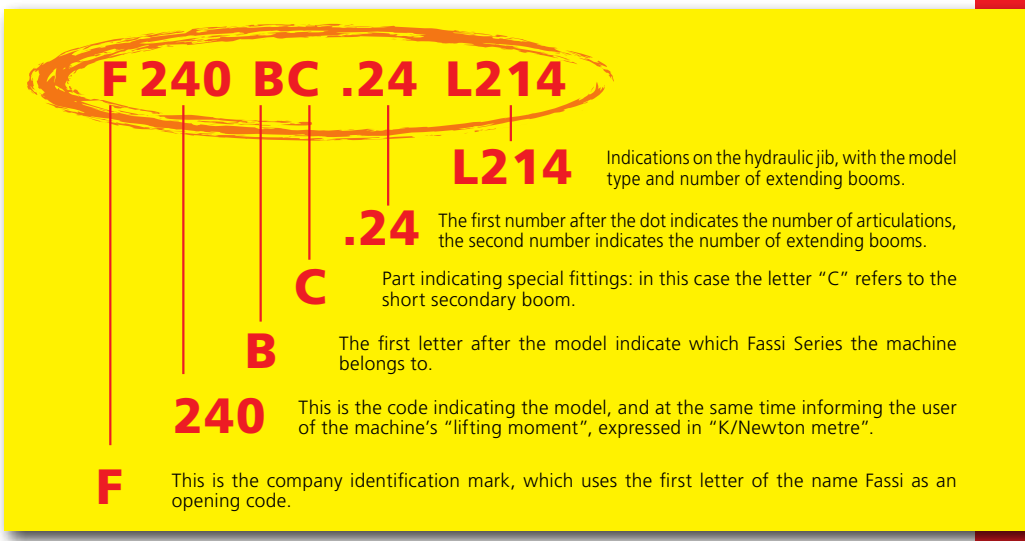
The Fassi range, which is the widest in the world of articulated cranes, is always the result of carefully thought-out, reasoned choices: when a crane is actually put into production and onto the market, it is a machine "without compromise".
At this point its abilities deserve to be listed in full detail. For this reason, once the crane is finally available, the "production" catalogue is created, with the "Fassi red" cover. This is destined to be the reference point from which all aspects of the model can be learned.

The codes used to identify the range of Fassi cranes

A code that tells you everything about the crane type and version

F240BC.24 L214

The first part of the series of codes used to identify a Fassi crane indicates the model, and refers both to the company itself (which is indicated with the "F" of Fassi), and to the most important element in terms of lifting capacity. the t/m value, expressed in K/Newton (in this case 240).



F240BC.24 L214

Immediately after the model code, we find a letter indicating the technological version to which the specific machine belongs. In this case we have technological version "B". In place of the B, there might be a letter "A" or "D": these letters express the various technological versions that have succeeded one another, in chronological order, from A to D. Alternatively, there might be F or FM (fixed, marine).

F240BC.24 L214

After the series code there may be other letters, indicating certain specific fittings on the machine.

In this case the letter "C" indicates a short secondary boom. There might be other codes: one of these is XP, which indicates that the machine is fitted with the "Extra Power" device, this means it has a power reserve that cranes provide for users to help in more difficult working situations, resulting from heavy loads of extremely complex dynamic situations.

F240BC.24 L214

The penultimate set of codes indicates two extremely important aspects for the dynamic and working potential of the machine: the first number after the dot indicates the articulations, while the second number expresses the number of extending hydraulic booms. In this case there are 2 articulations and 4 extending booms.

F240BC.24 L214

Indications on the crane model and its main features are completed by the code indicating the presence (letter L) and type (number) of hydraulic jib with which the machine is fitted. In the case of the crane shown here, the number 21 indicates the model of jib, while the number 4 indicates the number of extending booms.

The working speed of Fassi cranes

A fundamental aspect when selecting a crane, as it allows reductions in working times and use of the machine.

THE JOURNALIST
Macarena García
Editor of the magazine Movicarga, one of the most important Spanish publications in this sector.

Among the least known aspects of hydraulic crane performance, working speed is a feature that needs to be discussed in greater depth. Speed and time saving mean a greater opportunity for movement and lifting services during the working day. However, speed must never detract from the other performance levels of the crane and from overall safety. It is therefore interesting to test a crane fitted with three devices like Fassi's XF (Extra Fast), Flow Sharing and ADC (Automatic Dynamic Control), technologies that are the most ad-

vanced expression of optimisation, both of time and working dynamics, in complete safety.

Test characteristics

We organised the test on the premises of a Fassi customer based in Barcelona (Spain), who trades in building materials. The customer in question allowed us to carry out tests on the time required to lift and move bins of loose building materials.

However, first of all we started by calculating the time required for what can be termed "basic manoeuvres".

We were extremely interested in this test, because Fassi's technical and operating specifications indicated particularly fast times, and we wanted to test these out in practice.

The speed of basic crane movements

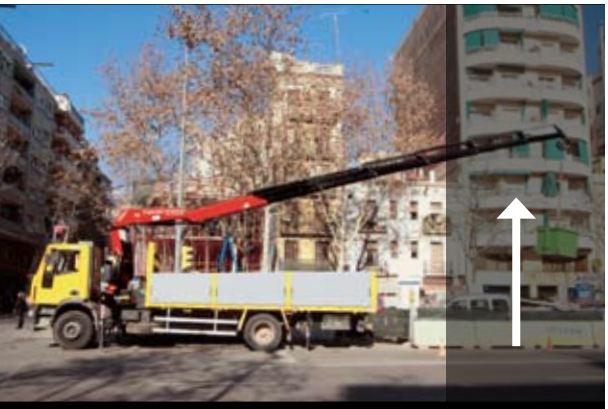
First of all we calculated the time required to move the crane from the rest position, folded behind the cab, to the working position with booms vertical. The whole movement was carried out in 32 seconds.

We then went on to calculate the time required to extend the booms to maximum. On the crane we were testing there were 6 extending booms: this operation actually took 43 seconds. We then tried retracting the booms, and timed this operation at 39 seconds net.

We then went on to look at the time required to turn the crane by 360°, which took 45 seconds, within the limits set by Fassi to guarantee safety. Starting with the crane in a completely horizontal position, we then checked the lifting speed at max-

The crane being tested is a F260BXP Evolution. This was not a random choice. This crane belongs to the Evolution series, which is equipped with all the newest Fassi technology. As in many other countries, here in Spain there is an increased request for extremely long cranes, fitted with a number of extensions, that are extremely versatile and can be used in a wide range of lifting situations. The Spanish users also like cranes with large oil tanks and with heat exchangers, so that they can work in maximum safety and peace of mind even in areas of the country where temperatures can become very high.

F260BXP Evolution



The considerable results seen during our test have been made possible thanks to a Fassi system known as XF: a new system of lock valves for the lifting rams and oil regeneration valves for the extension rams, which reduces the machine's working times.

The Fassi customer who took part in the test

The test was carried out in Barcelona at GRUAS Y TRASPORTE EL RAYO AMARILLO, who hires out cranes for the building industry. The company currently has a fleet of 60 vehicles, including 35 2, 3 and 4 axle trucks of between 20 and 80 tons, all with Fassi cranes.

imum extension: this was found to take 20 seconds; movement in the opposite direction stopped the clock at just 12 seconds. Finally, we timed how long it took to move from the standard working position to the rest position: the whole operation took 26 seconds.

Results like these are certainly due to a great extent to use of the Fassi XF system. The XF system works using a new generation of extending rams, which have a perfect piston thrust ratio on the cylinder and shaft side, so as to guarantee the best possible oil regeneration valve performance. This ensures considerable increases in the overall speed of the machine. Using the XF system the basic cycle times are reduced by a considerable amount, and greater working fluidity is guaranteed.

Tests with working loads

To carry out our first test we used a bin of loose material weighing 800 Kg.

We immediately noted the importance of the Flow Sharing system. In effect, movement was carried out by simultaneous activation of three functions: lifting of the main boom, lifting of the secondary boom and extension of the extending booms. The system allowed maximum performance in terms of speed, and effective multiple function management. Flow Sharing enables a greater flow of oil to be sent to the digital hydraulic distributor, giving genuine multiple function performance as the movements of the lifting rams vary.

The ADC system manages the speed of crane movements automatically as the load varies, allowing less experienced or more audacious users to operate in full safety, while saving the crane from the stress imposed by excessively sudden or risky manoeuvres.

We then moved on to examine the XP system, loading the crane with an extremely severe load, at the limit of its lifting capacity: a load weighing 4.8 t. We wanted to see how the Fassi XP system works.

The Fassi XP system is a power reserve that Fassi cranes provide for users to help in more difficult situations.

We lifted and transported the load in conditions that would have put a normal crane into severe difficulty. We, on the contrary, noted that

our Fassi crane with XP provides a surplus of power exactly when it is needed, allowing us to get out of even the most critical situations. The XP system enabled us to avoid having to stop work, which would have wasted time.

Speed with the winch

Our test ended by a trial using the V20 winch fitted on the crane. Here again we looked at times. We applied a load weighing 800 Kg to the winch hook. Lifting to 20 metres took 23 seconds. In this final test we once again confirm that the Fassi crane gives excellent performance, even when using this important accessory.

Conclusions:
this Fassi F260BXP.26 crane passed its speed test with flying colours, and in total safety.

The ability to carry out various movements simultaneously is essential in order to save precious time. We were interested to see that Fassi has perfected a Flow Sharing system (see below) that guarantees genuine multiple function performance.

The new generation of Fassi winches, such as the V20 tested by use, are extremely convincing and very fast.

The "path" of steel, from raw material to "Fassi red"

Interview with Terzo Prosdocimi

Fassi "product industrialisation" Team

"When manufacturing a crane the steel is obviously an essential structural element to ensure you reach the required performance levels with total safety and reliability.

First of all it must be said that the crane has to weigh as little as possible, because its mass is part of the tare weight, and will therefore condition the capacity of the truck on which it is fitted. Designers therefore have to identify and select materials characterised by high levels of resistance, enabling them to achieve the performance levels required by the crane while at the same time optimising the weight of the various structural elements. This means using special steels, and in particular steel plates with high and extremely high elastic limits, with characteristics that are guaranteed and certified by the manufacturer. To understand the difference between normal carbon steel and steel with an extremely high elastic limit, let me give an example: if we subject a normal steel wire with a section of 1 mm^2 to a load of 250 N (Newton), the wire will stretch and when we remove the load it will not return to its original length, but will remain deformed. It is said that the material has been subjected to a load exceeding its elastic limit, and it has yielded. In the case of steel with extremely high elastic limits, a unit load of over 1100 N/mm^2 has to be applied before permanent deformation is seen. The yield point is thus the limit load beyond which the deformation changes from elastic (when the load is removed the material returns to its original dimensions) to permanent. The yield value, together with the breaking load, determines the level of stress allowed, that is to say a value that is different for every quality of material, and is used by designers when sizing components, so as to ensure that these will resist without structural damage for the whole of the crane's working life.

At world level, there are not many steel manufacturers who produce these special steels, and not all the steels are the same, even if they come from the best manufacturers. In other words, even if the types of steel have similar mechanical characteristics (yield and breaking points), there are many other characteristics that may determine which one is chosen to optimise machine performance, particularly in the long term.

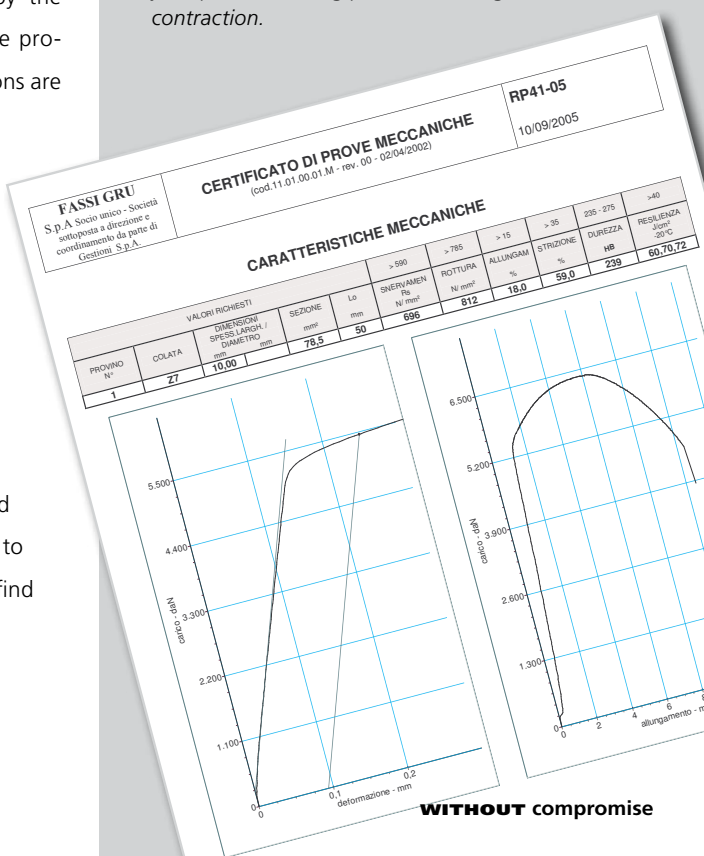
In many years of testing, study and research, FASSI has created a database that enables its designers to make

the most appropriate choices, so as to get the maximum performance from these types of steel in complete safety. Quality is guaranteed by strict controls, which are carried out before the materials are used, not only to ascertain the mechanical characteristics and resilience (the material's ability to support impact), but also to check, for example in the case of plate metal, that each sheet of metal complies with these values and geometric/size characteristics (uniform thickness, flatness, etc…)".

Is the same attention in the choice of materials applied both to light-weight cranes and heavier models?

"FASSI quality is the same for the whole of its product range. All the materials used are approved by the R&D department, and the same procedures and operating instructions are applied to all goods supplied. Even the control schedules are the same, whether the component in question is for a 10 KNm crane or a 1500 KNm one. I would like to underline the aspect relating to approval of materials. Each new material, and in particular semi-finished steel components, is subjected to a series of tests before use, to find

The steel used in Fassi products is accompanied by specific certificates that guarantee its mechanical properties, which include: yield point, breaking point, stretching and contraction.

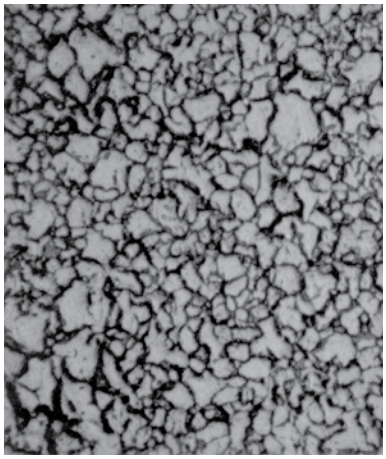

FASSI GRU S.p.A Socio unico - Società sottoposta a direzione e coordinamento da parte di Gestioni S.p.A.

CERTIFICATO DI PROVE MECCANICHE
(cod.11.01.00.01.M - rev. 00 - 02/04/2002)

RP41-05
10/09/2005

CARATTERISTICHE MECCANICHE

VALORI RICHIESTI					> 590	> 785	> 15	> 35	235 - 275	>40
PROVINO N°	COLATA	DIMENSIONI SPESS.LARGH. / DIAMETRO mm	SEZIONE mm²	Lo mm	SNERVAMEN Rs N/ mm²	ROTTURA N/ mm²	ALLUNGAM %	STRIZIONE %	DUREZZA HB	RESILIENZA Joule -20°C
1	27	10,00	78,5	50	696	812	18,0	59,0	239	60,70,72

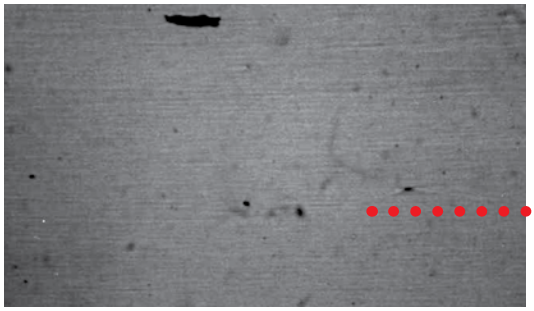


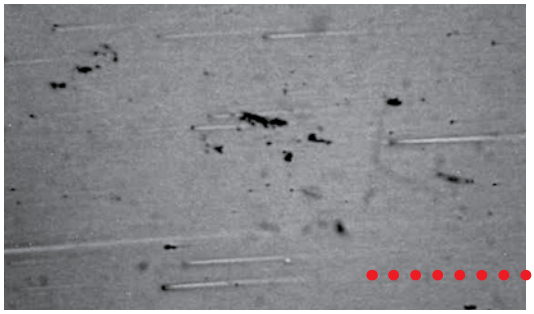
Fassi uses micrographic tests to check the size of the austenitic and ferrous grain of steels, so as to determine the tenacity of the material.

all its characteristics and its behaviour during the various machining phases (cutting, bending, welding, etc.…). All the relevant test data has to comply with our specifications before the material can be used. These tests have contributed greatly towards creating a database and a wealth of experience among technicians, so much so that, as I mentioned before, we can use objective data to discriminate between the materials from all the best qualified foundries".

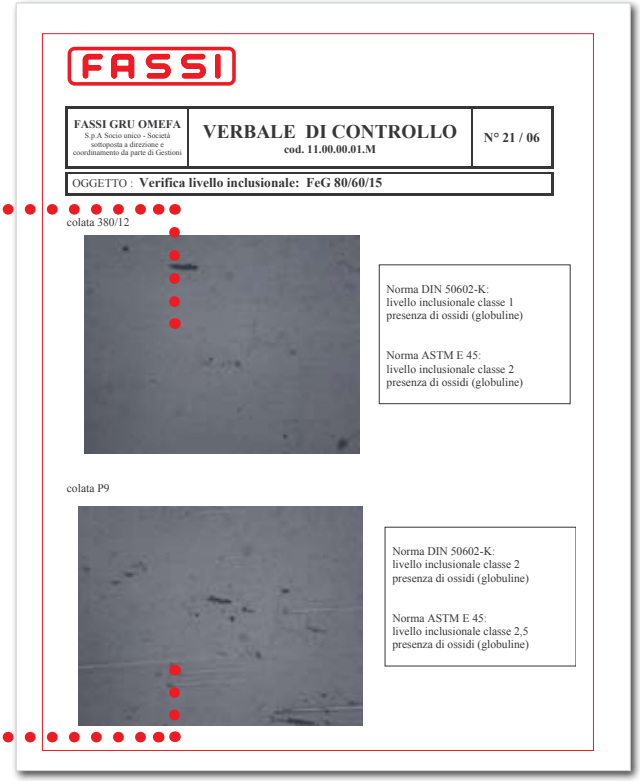
Steel that comes up to FASSI approval standards must be welded. How do you manage to reconcile high mechanical characteristics with the ability to weld the material ?

"You have brought up a point of fundamental importance in construction of the structural elements made from special materials. A weld is always an area of discontinuity in the material, the negative effects of which increase as the characteristics of the steel to be joined increases. For this reason it is absolutely necessary to reduce the negative effect of this lack of continuity, particularly in the presence of materials with a high and extremely high elastic limits, which are less easy to weld that ordinary non-alloy steels. It might be said that welding is a strategic operation in construction of the crane, and it is for this reason that Fassi deals with this process in an equally systematic and meticulous way, without leaving anything to chance. When defining a welded joint there are many points to be taken into consideration, including the chemical and metal characteristics of the materials to be joined, including the type of solder and the gas to be used in the MIG/MAG procedure (continuous inert/active gas arc-welding process). It is then of fundamental





The two micographies are an example of the scrupulous way in which Fassi checks the quality of materials: it highlights a comparison of the level of inclusions in the steels, deriving from castings in two different supply batches.


FASSI

FASSI GRU OMEFA S.p.A Socio unico - Società sottoposta a direzione e coordinamento da parte di Gestioni

VERBALE DI CONTROLLO
cod. 11.00.00.01.M

N° 21 / 06

OGGETTO : **Verifica livello inclusionale: FeG 80/60/15**

colata 380/12

Norma DIN 50602-K:
livello inclusionale classe 1
presenza di ossidi (globuline)

Norma ASTM E 45:
livello inclusionale classe 2
presenza di ossidi (globuline)

colata P9

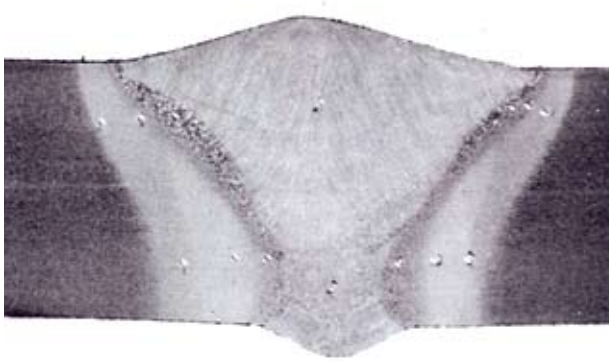
Norma DIN 50602-K:
livello inclusionale classe 2
presenza di ossidi (globuline)

Norma ASTM E 45:
livello inclusionale classe 2,5
presenza di ossidi (globuline)

importance for the mechanical characteristics and strength of the joint to define all the operating parameters. This work is carried out in advance by specialist technicians, making use of company know-how based on the database, which includes technological and laboratory tests carried out on a daily basis, in search of new materials and procedures to give ongoing improvement of the process. The joint must be as strong as possible, so as to take the best advantage of the characteristics of the extremely high elastic limit steels used which, as mentioned above, can reach yield capacities of over 1100 N/mm^2.

Again with an eye to continuous improvement, the Fassi technical department does not merely carry out research to increase the characteristics of welded joints, but it also studies the introduction of enbloc elements, such as cast and moulded element, to reduce the number of welds required and therefore the number of points in which there is a lack of continuity. This is all to the advantage of machine performance and reduction in weight.

When adopting cast and hot moulded elements it is also necessary for specialist technicians to carry out various operations, both during the design phase and to monitor manufacturing processes. The latter operations are carried out at the foundries and at our factories, with geometric/dimensional controls, laboratory tests and non destructive tests to verify the internal and surface "health" and guarantee the constant quality required. For all these reasons, in over forty years of production there have been very few cases in which the steel, the welds, the castings and the moulded elements have given trouble while at work. This is an extremely significant fact, bearing in mind that Fassi cranes are actually those with the longest working lives: even today, over half the cranes ever produced by Fassi is still in normal operation".



Fassi uses macrography to verify compliance of the welds. In this case it is possible to note two welds that have been correctly performed, and therefore comply with Fassi requirements.

These pictures show two cast enbloc base and column elements after checking: the lighter areas indicate the dimensional tests performed by tracing, the points that are highlighted are the areas subjected to X-ray analysis. These controls make it possible to check compliance of the dimensions and identify possible internal faults.

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