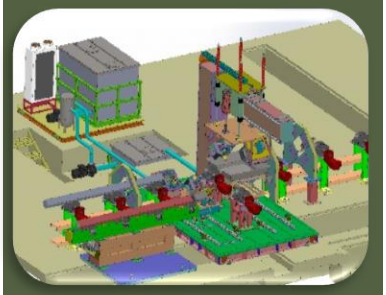
Automatic Ultrasonic Inspection System for Steel Ingots and Billets
(FLAW HUNTER UBT 109)



- The Importance of Steel Billet Inspection
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The Importance of Steel Billet Inspection

The production process for various steel sections, such as slabs, blooms, billets, and round bars, typically involves two main stages. In the first stage, these sections are cast, and in the second stage, the cast sections undergo rolling operations to achieve the desired dimensions and properties.

During the different manufacturing stages of these sections, various internal and surface defects can arise, including cracks, gas and shrinkage cavities, slag inclusions, non-metallic inclusions, and more. Some of these defects, due to their size, location, and depending on their application in the industry, are considered critical flaws that can significantly reduce the quality of the steel and potentially lead to severe accidents in sensitive industries.

Therefore, the accurate identification of these defects during the production of various steel sections and awareness of their distribution patterns within the steel's internal structure is a crucial and effective parameter for both buyers and manufacturers.

It plays a vital role in preventing potential catastrophic incidents.

Employing advanced inspection methods ensures a thorough quality assessment and confidence in the structural integrity of the final product.

Ultrasonic Testing

Today, significant advancements have been made in the field of Non-Destructive Testing (NDT) technologies. Among these, ultrasonic testing stands out as a powerful method that allows for the inspection of steel billets without causing any damage. It is capable of accurately detecting internal defects and measuring the thickness of various billet types.

Without a doubt, ultrasonic testing is one of the most practical and effective non-destructive testing methods for defect detection and thickness measurement in various square and round steel billets. This method provides accurate and reliable results, playing a crucial role in ensuring the quality of steel products.

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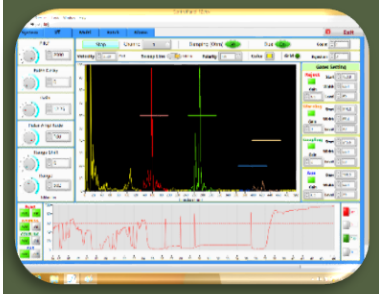
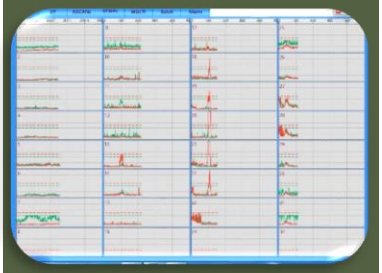




In the ultrasonic testing process, high-frequency sound waves are transmitted into the billet's structure by a probe (transducer).

These waves, upon encountering discontinuities (defects) or internal and external surfaces of the billet, are reflected

back and received by the same or other probes. The received ultrasonic waves are converted into electrical pulses and sent to the ultrasonic testing instrument.

The ultrasonic instrument then performs amplification and filtering operations on the received electrical pulses, displaying them as visual signals on its screen. Analysis of these signals by a trained operator provides detailed information about the presence, size, location, and potential type of defects within the billet.

In addition to defect detection, the ultrasonic instrument can accurately calculate and display the billet's wall thickness by precisely measuring the time interval between the signals reflected from different surfaces of the billet and considering the sound velocity in the material being tested. This capability is of high importance in controlling the dimensional quality of steel products.

Automatic Ultrasonic Inspection System for Steel Ingots and Billets (FLAW HUNTER UBT 109)

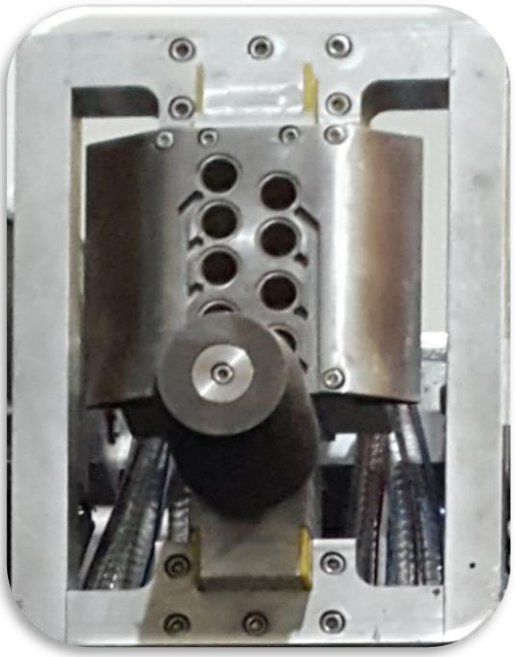
The FLAW HUNTER UBT 109 system is specifically designed and manufactured for testing square steel billets with dimensions ranging from 50×50 mm to 150×150 mm, and round billets with a maximum diameter of 200 mm. This system utilizes advanced ultrasonic technologies to provide a comprehensive and efficient solution for ensuring the quality of steel billets.

In its configuration for testing billets with maximum dimensions (e.g., 150×150 mm), the system incorporates 8 ultrasonic probes on each billet surface, providing a total of 32 channels and probes for testing from all four sides of the billet.

This multiple-probe arrangement ensures complete surface coverage and more accurate defect detection.

The system is equipped with four independent probe holders utilizing the Water Column technique. This technique optimizes the transmission of ultrasonic waves by creating a water column between the probe and the billet surface, improving the quality of the received signals.

The probe holders, employing a special suspension mechanism, float completely on the surface of the moving billet, maintaining proper contact.



The ultrasonic probes are positioned within the probe holders at specific intervals to ensure uniform and complete coverage of the billet surface.

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The FLAW HUNTER UBT 109 is a state-of-the-art ultrasonic inspection system designed for square and round steel billets. It features 32 probes with full surface coverage, enabling accurate detection of internal and surface flaws such as cracks, inclusions, and cavities. The system supports billets with significant off-straightness and includes safety features to prevent out-of-range entries. Real-time marking using color spray and data recording across 32 channels allow for precise defect localization and documentation. Its offline calibration system ensures high uptime and operational safety without halting production. With flexible probe holders, it can easily switch between billet types, making it a powerful, reliable, and efficient solution for quality assurance in steel production lines.

These probes transmit sound waves at a normal (perpendicular) angle into the billet, enabling the identification of all volumetric defects (such as cavities and inclusions) and planar defects (such as cracks and delaminations) equivalent to a Flat Bottom Hole with a diameter of 2 mm (FBH Ø 2mm) from a depth of 4 mm from each surface to the full thickness and along the entire length of the billet. This high sensitivity allows for the detection of small and critical flaws.

Other unique features of this device that distinguish it from other similar testing systems worldwide include the ability to test billets with an off-straightness (misalignment) of up to 20 mm per meter at the beginning and end of the billets, a highly specialized system for detecting out-of-tolerance off-straightness and twisting of billets, and a specific safety system to prevent the entry of billets with out-of-range dimensions (to prevent damage to the device).

These features ensure the system's stable and safe operation.

This advanced system is capable of recording and storing complete test results in 32 separate strip charts, providing the ability to accurately analyze the depth and location of defects along the length of the billet.

This capability facilitates comprehensive evaluation and documentation of the inspection process.

Furthermore, using two precise encoders and five independent color spray markers positioned on the four separate surfaces of the billet, the system can accurately mark the location of defects along the billet's length.

This feature enables faster tracking and removal of defective parts.

The offline calibration system is a unique feature of this system, allowing for calibration and maintenance of the device without requiring production line stoppage, thereby ensuring user safety and production efficiency.

Based on customer requirements, the system can be flexibly designed to accommodate the testing of both square and round billets by interchanging special probe holders. This enhances the system's versatility and efficiency.

Pejvak Rayan Company

Pejvak Rayan, a knowledge-based company, operates as a leading and innovative designer and manufacturer of probes, equipment, and ultrasonic testing systems for various industries.

With a deep understanding of the importance of inspecting various square and round steel billets and aiming to prevent risks arising from potential defects in sensitive industries that utilize these billets, the company has designed and manufactured an advanced ultrasonic inspection system.

This system is capable of accurately detecting defects and measuring the thickness of various steel billets with the highest level of precision and reliability.

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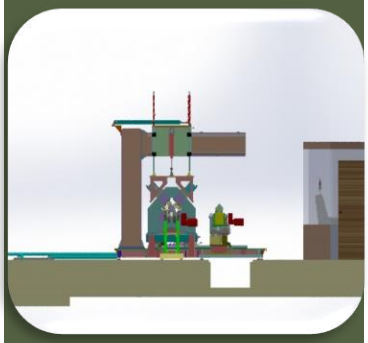

Advantages of choosing Pejvak Rayan Company

Industrial Ultrasonic Testing Equipment Manufacturer

-Trusted Expertise:
Over 20 years of experience in ultrasonic testing systems.

-Advanced Technology:
High-accuracy flaw detection with global standards; suitable for pipes, billets, rebars, ingots, sheets, and plates.

-Cost-Effective Quality:
Competitive pricing tailored for Asian markets — without compromising performance.

-Complete Service:
On-site installation, professional training, and ongoing technical support.

Experience world-class technology with region-friendly pricing

Pejvak Rayan – Precision You Can Rely On

Technical Specifications of Testable Billets with the UBT 109 System

No	Characteristic	Values
1	Billet Dimensions	Square billets up to 150 × 150 mm and round billets up to Ø 200 mm
2	Billet Length	4 to 12 meters
3	Billet Material	Carbon Steel and Alloy Steel (High, Medium, Low, Stainless)
4	Linear Testing Speed	Max. 25 meters per minute
5	Billet Temperature	Max. 60°C
6	Detectable Defects	Various volumetric and planar defects equivalent to an FBH Ø 2mm
7	Billet Misalignment	20 mm per meter at the beginning and end, and max. 35 mm over 6 meters
8	Testable Range	Testing from all four surfaces along the billet, excluding 100 mm at each end

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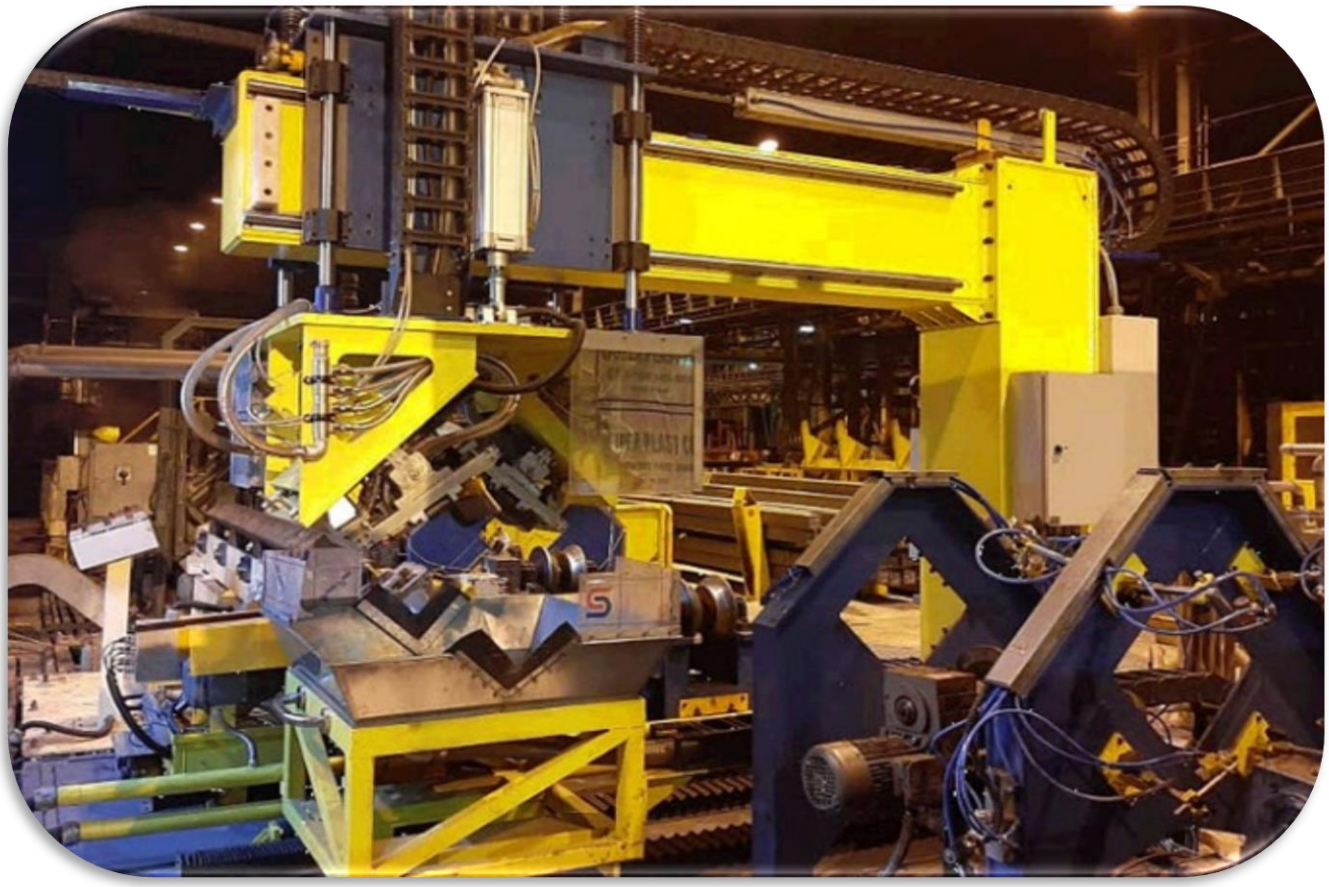

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