

FINANCIAL EVALUATION REPORT

(As Per Rule 35 of PP Rules, 2024)

1. Name of Procuring Agency: Federal Board of Revenue (HQ)
2. Method of Procurement: Two Stage Two Envelope Bidding Procedure
3. Title of Procurement: Hiring of Authorized Vendors for Supply, Installation and Maintenance of Production Monitoring System in Iron and Steel Sector (Stage-2)
4. Tender Inquiry No. 1(6) IR/TDU/2026
5. PPRA Reference No. EPADS Reference No.F-26011667064
6. Date & Time of Bid Closing: 14th September, 2026 11:00 AM
7. Date & Time of Bid Opening: 14th September, 2026 11:30 AM
8. No. of Bids Received: 02
9. Criteria for Bid Evaluation: Financial Bid Evaluation Report attached
10. Details of Bid Evaluation: Financial Bid Evaluation Report attached

Name of Bidder	Technical Marks (if applicable)	Total Solution Cost including one Time Deployment charges and 3 Year SLA for complete System per site (Exclusive of taxes) (In PKR)	Rule/Regulation/SBD*/Policy/Basis of Rejection/Acceptance as per Rule 35 of PP Rules, 2024
M/s Obsidian	70	Rs. 4,070,000/-	Responsive Recommended for grant of "Authorization"
M/s ISSM Labelling Solutions (Pvt) Ltd.	75	Rs. 11,480,000/-	Responsive Recommended for grant of "Authorization"

11. Any other additional/supporting information the procuring agency may like to share.

Signature

Official Stamp

Farrukh Amir Sial
Secretary (Administration)

* Standard Bidding Document

1(6) IR/TDU/2026

INVITATION TO BID

FINANCIAL EVALUATION REPORT/ COMBINED EVALUATION REPORT

Invitation to Bid Reference No.	1(6) IR/TDU/2026
Invitation to Bid Title	Hiring of Authorized Vendors for Supply, Installation and Maintenance of Production Monitoring System in <u>Iron and Steel Sector (Stage-2)</u>
Invitation to Bid Issuance/ Publishing Date (Stage-I)	17 th January, 2026
Pre-Bid meeting Date (Stage-I)	22 nd January, 2026
Bids Submission Date (Stage-I)	17 th February, 2026
Publishing (Stage-I)	National Press (two leading national daily newspapers – One English and One Urdu) Website(s): FBR
Invitation to Bid (Stage-II) uploading date on EPADS	31 st August, 2026
Procurement Method/ Process	Two stage Two Envelope bidding procedure – Open Competitive Bidding Process
Bids Submission Date (Stage-II)	14 th September 2026
Technical Evaluation Report	22 nd September, 2026
Financial Evaluation Report Signing Date	5 th October, 2026


Waqas Ahmed Langah
Secretary (Budget & Expenditure)
Federal Board of Revenue
Islamabad

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1. **Project Background**

The FBR is undertaking a significant digitalization initiative aimed at enhancing its tax collection capabilities and addressing structural gaps in Pakistan's tax system. As part of this transformation, FBR seeks to deploy a production monitoring and counting system at all Iron and Steel manufacturing facilities (Melting and Re-Rolling units) in Pakistan to improve tax compliance and prevent revenue leakage within the sector, particularly in the handling of Billets, Ingots, Rebars, and Girders. As part of the agreement, selected vendors will be responsible for providing and installing a production monitoring system (based on Video Analytics, Laser Counting, or equivalent technologies). Vendors will also be responsible for providing post-installation maintenance and tech support services to the manufacturers.

2. **Objective & Vision:**

FBR recognizes the critical role of technology in tackling the challenges of tax evasion, unreported production, and discrepancies in steel production data. This production monitoring project aims to deliver real-time visibility into the total production of steel manufacturers. The solution will enable FBR to monitor the production count ensuring accurate reporting, transparent audits, and correct tax payments. A panel of multiple authorized vendors will provide manufacturers access to a pool of competitive vendors.

- (i) Business Functions and Performance Requirement
- (ii) Functional Performance Requirements of the Information System
- (iii) Related Information Technology Issues and Initiatives

3. **Scope of the System**

The Scope of the System is to implement an end-to-end production monitoring and counting system (including software, hardware, and integration) primarily utilizing Video Analytics, Laser Counting, or IoT Sensors proposed by the vendor, provided it meets both the Technical and Proof of Concept evaluation criteria defined in Section V Scope of Work and is more cost-effective than the standard monitoring solution, across Iron and Steel manufacturing facilities (Melting and Re-Rolling units) in Pakistan to accurately count the 128 number of steel products (e.g., Billets, Ingots, Rebars, Girders) to prevent underreporting by manufacturers.


Waqas Ahmed Langah
Secretary (Budget & Expenditure)
Federal Board of Revenue
Islamabad

4. Brief Terms of Bidding Document

Schedule of Requirements	FBR intends to ensure all iron and steel manufacturing facilities in Pakistan are covered as per the following installation schedule: Cumulative 20% lines to be covered by: 31 st October 2026 Cumulative 50% lines to be covered by: 30th November 2026 Cumulative 100% lines to be covered by: 31st December 2026 Authorized vendor(s) should have all required equipment (hardware and software) readily available to enable timely deployment of the required production monitoring and counting system (e.g., Video Analytics or IoT Sensors for Weighbridge Integration) across steel manufacturing facilities in Pakistan.
Bid Validity from bid opening	The Bid Validity period shall be 120 days or extendable as mutually agreed.
Bid Security	PKR 1,000,000 (mandatory)
Performance Guarantee	The Performance Guarantee shall be applicable and will be set at fixed amount of PKR 5,000,000 only. Note: This limit may be revised and lowered
Liquidated Damages	• Rate: A penalty of 0.2% of the total performance guarantee per day of non-compliance for each affected site. • Maximum Deduction: The cumulative penalty shall not exceed the value of the performance guarantee submitted by the vendor
Currency for Evaluation of Bid	Pak Rupees (PKR)

5. Procurement Process

The procurement process for the subject activity is **Two Stage Two Envelopes Bidding Procedure** – Invitation to Bid – Open Competitive Bidding Process. The advertisement was published in national press (two leading national daily newspapers – One English and One Urdu) on **17th January, 2026 (Annexure-I)** as well as uploaded on e-PADS, FBR (<https://www.fbr.gov.pk/>) and PPRA (<https://www.ppra.gov.pk>). Invitation to Bid for (Stage-II) was uploaded on EPADS on **31st August, 2026**. Following table mentions the publication of corrigendum, addendums and other aspects of the procurement process.

Invitation to Bid Reference No.	1(6) IR/TDU/2026
Invitation to Bid Title	Hiring of Authorized Vendors for Supply, Installation and Maintenance of Production Monitoring System in Iron and Steel Sector (Stage-2)
Invitation to Bid Issuance/ Publishing Date (Stage-I)	17 th January, 2026
Pre-Bid meeting Date (Stage-I)	22 nd January, 2026


Waqas Ahmed Langah
Secretary (Budget & Expenditure)
Federal Board of Revenue
Islamabad

Bids Submission Date (Stage-I)	17 th February, 2026
Publishing (Stage-I)	National Press (two leading national daily newspapers – One English and One Urdu) Website(s): FBR
Invitation to Bid (Stage-II) uploading date on EPADS	31 st August, 2026
Procurement Method/ Process	Two stage bidding procedure – Open Competitive Bidding Process
Bids Submission Date (Stage-II)	14 th September, 2026
Technical Evaluation Report	22 nd September, 2026
Financial Evaluation Report Signing Date	5 th October, 2026

6. Technical/ Financial Evaluation Committee

Following Technical/ Financial Evaluation Committee was designated for the evaluation of the subject Invitation to Bid:

Sr. No	Name	Designation	Role
1.	Mr. Zubair Bilal	Member (IR-Operations), FBR	Chairman/ Convener
2.	Mr. Ashhad Jawwad	Member (Customs Policy)	Member
3.	Dr. Najeibullah	Chief (Tax Reforms)	Member
4.	Dr. Muhammad Khurram	Chief (Mgt/HR-IR)	Member
5.	Mr. Rizwan Salabat	Chief (Mgt/HR-Customs)	Member
6.	Mr. Amjad-ur-Rehman	Chief (F&C) – Customs	Member
7.	Mr. Waqas Ahmed Langah	Secretary (Budget & Expenditure)	Member/ Secretary
8.	Faisal Sattar	Chief Executive Officer	Member

7. Technical Bids Opening & Evaluation

In accordance with the **Two Stage Two Envelopes Bidding Procedure**, technical bids for **Stage-II** were opened publicly on the bid submission date (i.e. **14th September, 2026 at 11:30 a.m.**) after proposals submission time at FBR House by the Technical/ Financial Evaluation Committee in the presence of bidders authorized representatives. The bids availability on e-PADS was checked and confirmed in presence of bidders authorized representatives. As per the technical bid opening statement (**Annexure-II**), following bidders participated in the bidding process and submitted their bids.

Sr. No	Bidder	Bid Submitted	Remarks
1	M/s ISSM Labelling Solutions (Pvt) Ltd	✓	Bid Submitted in Hard Copy and also on EPADS as required.
2	M/s Obsidian	✓	Bid Submitted in Hard Copy and also on EPADS as required.


Waqas Ahmed Langah
 Secretary (Budget & Expenditure)
 Federal Board of Revenue
 Islamabad

Preliminary examination of the technical bids was carried out. The examination included verification/ review of bidder proposal form, completeness of the bid, eligible countries and bid validity confirmation as per requirement of the bidding document.

Bidder	Bid Form	Eligible Country	Bid Validity	Substantial Responsiveness	Acceptance for detailed Examination
M/s ISSM Labelling Solutions (Pvt) Ltd	Yes	Pakistan	Yes	Yes	Yes
M/s Obsidian	Yes	Pakistan	Yes	Yes	Yes

In order to conclude the technical evaluation of bids, all bids were evaluated with reference to technical criteria mentioned in the bidding document of the subject activity. As a result of completion of evaluation process, following scores were achieved by the bidders as per technical evaluation report (**Annexure-III**):

Sr. No.	Bidder	Technical Bid Score	Percentage Score	Remarks
1.	M/s ISSM Labelling Solutions (Pvt) Ltd	75/100	75.00%	Qualified the Technical Bid Evaluation Criteria of minimum 70% score.
2.	M/s Obsidian	70/100	75.00%	Qualified the Technical Bid Evaluation Criteria of minimum 70% score.

The mandatory Proof-of-Concept (POC) testing was also conducted for proposed solutions at selected industry sites on **15th September, 2026**. The POC reports were annexed with the technical evaluation report and as per the POC reports, both the bidders (M/s ISSM Labelling Solutions (Pvt) Ltd. and M/s Obsidian) successfully passed the POC requirements.

8. **Financial Bids Opening**

In accordance with the two-stage two envelope bidding procedure, the bidders were informed about financial bid opening for **1st October, 2026**. Financial bids of responsive bidders were opened on the scheduled date and time by the Technical/ Financial Evaluation Committee. The financial bids were opened in accordance with instructions provided in the bidding document. The financial bids opening sheet is placed at **Annexure-III**.

9. **Evaluation of Financial Bids**

The financials bids were evaluated by the Technical/ Financial Evaluation Committee in accordance with criteria defined in the bidding document. The evaluation summary is as under:

S. No.	Bidder Name	Amount quoted by bidders as one Time Deployment charges (per site) (Exclusive of taxes) (In PKR)
1.	M/s ISSM Labelling Solutions (Pvt) Ltd	Rs. 5,480,000/-
2.	M/s Obsidian	Rs. 2,270,000/-

The detailed breakdown of cost is available in the financial bids which is attached as **Annexure-IV** to this evaluation report.

10. Technical/ Financial Evaluation Committee Recommendations

As per the evaluation criteria stated in the bidding document and clause 5(e) of the Invitation to Bid, the following bidders are recommended for issuance of authorization:

Sr. No.	Bidder Name	Total Technical Score	Technical Score Obtained	Total Solution Cost including one Time Deployment charges and 3 Year SLA for complete System per site (Exclusive of taxes) (In PKR)	Recommendation
1.	M/s Obsidian	100	70	Rs. 4,070,000/-	Authorization may be issued
2.	M/s ISSM Labelling Solutions (Pvt) Ltd.	100	75	Rs. 11,480,000/-	Authorization may be issued


Waqas Ahmed Langah
Secretary (Budget & Expenditure)
Federal Board of Revenue
Islamabad

FINANCAIL BID OPENING SHEET

PPRA Web Reference No:

1(6)IR/TDU/2026

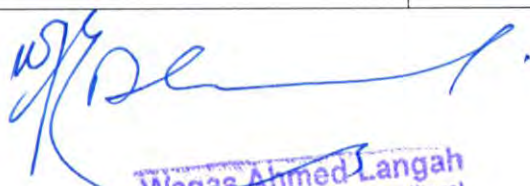
Title:

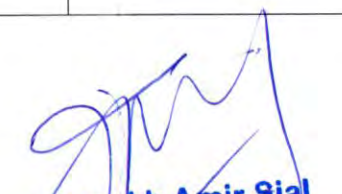
**AUTHORIZED VENDORS FOR SUPPLY, INSTALLATION AND
MAINTENANCE OF PRODUCTION MONITORING SYSTEM IN
IRON AND STEEL SECTOR (Stage-2)**

Financial Bid Opening Date/ Time:

1st October, 2026 at 11:30 a.m.

S. No.	Name of Bidder/Firms	Total Bid Value (In Rs.)		Remarks (If any)	Signature of Bidders' Representative
		In Figure	In Words		
1.	M/s ISSM Lubelling				
2.	M/s obsidian				
3.					
4.					
5.					
6.					
7.					
8.					


Waqas Ahmed Langah
Secretary (Budget & Expenditure)
Federal Board of Revenue
Islamabad


Farrukh Amir Sial
Secretary (Administration)
Federal Board of Revenue
Islamabad

TECHNICAL EVALUATION REPORT

(As Per Rule 35 of PP Rules, 2004)

- 1 Name of Procuring Agency Federal Board of Revenue (HQ)
- 2 Method of Procurement Two Stage Two Envelop Bidding Procedure
- 3 Title of Procurement AUTHORIZED VENDORS FOR SUPPLY, INSTALLATION AND MAINTENANCE OF PRODUCTIONS MONITORING SYSTEM IN IRON AND STEEL SECTOR
- 4 Tender Inquiry No. 1(6)/IR/TDU/2026
- 5 PPRA Ref. No. (TSE). ----- EPADS Reference No: F-26011667064
- 6 Date & Time of Bid Closing 14th September 2026 11:00 AM
- 7 Date & Time of Bid Opening 14th September 2026 11:30 AM
- 8 No of Bids Received 02
- 9 Criteria for Bid Evaluation Technical Bid Evaluation Report Attached.
- 10 Details of Bid(s) Evaluation Technical Bid Evaluation Report Attached.

Name of Bidder	Technical Marks (if applicable)	POC Status	Rule/Regulation/SBD*/Policy/Basis of Rejection/Acceptance as per Rule 35 of PP Rules, 2004.
M/s ISSM Labeling Solutions Pvt Ltd.	75	Passed	Responsive
M/s Obsidian.	70	Passed	Responsive

11. Any other additional/supporting information, the procuring agency may like to share.

Signature: _____

Official Stamp: _____

Farrukh Amir Sial
Secretary (Administration)

**Standard Bidding Documents (SBD).*

1(6)/IR/TDU/2026

INVITATION TO BID (ITB)

TECHNICAL BID(S) EVALUATION REPORT

Invitation to Bid Reference No.	1(6) IR/TDU/2026
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Technical Bids Evaluation Report Signing Date	22 nd September, 2026


Waqas Ahmed Langa
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Annexure-I	Invitation to Bid Publications (Clippings)
Annexure-II	Technical Bid Opening Statement.
Annexure-III	Mandatory Requirements for Eligibility/Responsiveness and Bid Evaluation Criteria (Technical)
Annexure-IV	Proof-of-Concept Reports


Waqas Ahmed Langa
Secretary (Budget & Expenditure)
Federal Board of Revenue
Islamabad

1. **Project Background**

The FBR is undertaking a significant digitalization initiative aimed at enhancing its tax collection capabilities and addressing structural gaps in Pakistan's tax system. As part of this transformation, FBR seeks to deploy a production monitoring and counting system at all Iron and Steel manufacturing facilities (Melting and Re-Rolling units) in Pakistan to improve tax compliance and prevent revenue leakage within the sector, particularly in the handling of Billets, Ingots, Rebars, and Girders. As part of the agreement, selected vendors will be responsible for providing and installing a production monitoring system (based on Video Analytics, Laser Counting, or equivalent technologies). Vendors will also be responsible for providing post-installation maintenance and tech support services to the manufacturers.

2. **Objective & Vision:**

FBR recognizes the critical role of technology in tackling the challenges of tax evasion, unreported production, and discrepancies in steel production data. This production monitoring project aims to deliver real-time visibility into the total production of steel manufacturers. The solution will enable FBR to monitor the production count ensuring accurate reporting, transparent audits, and correct tax payments. A panel of multiple authorized vendors will provide manufacturers access to a pool of competitive vendors.

- (i) Business Functions and Performance Requirement
- (ii) Functional Performance Requirements of the Information System
- (iii) Related Information Technology Issues and Initiatives

3. **Scope of the System**

The Scope of the System is to implement an end-to-end production monitoring and counting system (including software, hardware, and integration) primarily utilizing Video Analytics, Laser Counting, or IoT Sensors proposed by the vendor, provided it meets both the Technical and Proof of Concept evaluation criteria defined in Section V Scope of Work and is more cost-effective than the standard monitoring solution, across Iron and Steel manufacturing facilities (Melting and Re-Rolling units) in Pakistan to accurately count the 128 number of steel products (e.g., Billets, Ingots, Rebars, Girders) to prevent underreporting by manufacturers.


Waqas Ahmed Lashari
Secretary (Budget & Expenditure)
Federal Board of Revenue
Islamabad

4. Brief Terms of Invitation to Bid Document

Schedule of Requirements	FBR intends to ensure all iron and steel manufacturing facilities in Pakistan are covered as per the following installation schedule: Cumulative 20% lines to be covered by: 31 st October 2026 Cumulative 50% lines to be covered by: 30th November 2026 Cumulative 100% lines to be covered by: 31st December 2026 Authorized vendor(s) should have all required equipment (hardware and software) readily available to enable timely deployment of the required production monitoring and counting system (e.g., Video Analytics or IoT Sensors for Weighbridge Integration) across steel manufacturing facilities in Pakistan.
Bid Validity from bid opening	The Bid Validity period shall be 120 days or extendable as mutually agreed.
Bid Security	PKR 1,000,000 (mandatory)
Performance Guarantee	The Performance Guarantee shall be applicable and will be set at fixed amount of PKR 5,000,000 only. Note: This limit may be revised and lowered
Liquidated Damages	• Rate: A penalty of 0.2% of the total performance guarantee per day of non-compliance for each affected site. • Maximum Deduction: The cumulative penalty shall not exceed the value of the performance guarantee submitted by the vendor
Currency for Evaluation of Bid	Pak Rupees (PKR)

5. Bid Process

The bidding process for the subject activity is **Two stage bidding procedure** – Invitation to Bid – Open Competitive Bidding Process. Invitation to Bid (**Stage-I**) notification was published in national press (two leading national daily newspapers – One English and One Urdu) on **17th January, 2026 (Annexure-I)** as well as uploaded on e-PADS, FBR (<https://www.fbr.gov.pk/>) and PPRA (<https://www.ppra.gov.pk>). Invitation to Bid (Stage-2) was uploaded on EPADS portal on 31st August, 2026.

Invitation to Bid Reference No.	1(6) IR/TDU/2026
Invitation to Bid Title	Hiring of Authorized Vendors for Supply, Installation and Maintenance of Production Monitoring System in Iron and Steel Sector (Stage-2)
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Bids Submission Date (Stage-I)	17 th February, 2026

Publishing (Stage-I)	National Press (two leading national daily newspapers – One English and One Urdu) Website(s): FBR
Invitation to Bid (Stage-II) uploading date on EPADS	31 st August, 2026
Procurement Method/ Process	Two stage bidding procedure – Open Competitive Bidding Process
Bids Submission Date (Stage-II)	14 th September, 2026
Technical Bids Evaluation Report Signing Date	22 nd September, 2026

6. Technical/ Financial Evaluation Committee

Following Technical/ Financial Evaluation Committee was designated for the evaluation of the subject Invitation to Bid:

Sr. No	Name	Designation	Role
1.	Mr. Zubair Bilal	Member (IR-Operations), FBR	Chairman/ Convener
2.	Mr. Ashhad Jawwadss	Member (Customs Policy)	Member
3.	Dr. Najeebullah	Chief (Tax Reforms)	Member
4.	Dr. Muhammad Khurram	Chief (Mgt/HR-IR)	Member
5.	Mr. Rizwan Salabat	Chief (Mgt/HR-Customs)	Member
6.	Mr. Amjad-ur-Rehman	Chief (F&C) – Customs	Member
7.	Mr. Waqas Ahmed Langah	Secretary (Budget & Expenditure)	Member/Secretary
8.	Faisal Sattar	Chief Executive Officer	Member

7. Bid(s) Received

On the bid submission date and time **14th September, 2026 at 11:30 a.m.,** following bids were received:

Sr. No	Bidders	Bid Submitted
1.	M/s ISSM Labelling Solutions (Pvt) Ltd	Yes
2.	M/s Obsidian	Yes

8. Bid Opening

In accordance with the bid opening procedure of **Two stage bidding procedure**, technical bids for **Stage-II** of the subject procurement activity were opened publicly on the same date immediately after bid submission time at FBR House by the Technical/ Financial Evaluation Committee in the presence of bidders authorized representatives. The bids availability on


Waqas Ahmed Langah
 Secretary (Budget & Expenditure)
 Federal Board of Revenue
 Islamabad

e-PADS was checked and confirmed in presence of bidders authorized representatives. Availability of required documents/information as per ITB's terms, were read out at the time of bid opening meeting. The bid opening statement is placed at **Annexure-II**.

9. Preliminary Examination

Preliminary examination of the technical bids was carried out. The examination included verification/ review of bidder bid form, completeness of the bid, eligible countries, bid validity confirmation and availability of bid security as per requirement of the Invitation to Bid. The finding(s) from preliminary examination is summarized below:

Bidders	Bid Form	Eligible Country	Bid Validity	Bid Security	Acceptance for detailed Examination
M/s ISSM Labelling Solutions (Pvt) Ltd	Yes	Pakistan	Yes	Yes	Yes
M/s Obsidian	Yes	Pakistan	Yes	Yes	Yes

10. Detailed Technical Evaluation

The mandatory requirements and marking criteria for evaluation of proposals advertised in the Request for Proposal along with detailed proposal's evaluation, are submitted at **Annexure III**.

11. Bids Accepted as "Responsive/Technical Qualified" to the Invitation to Bid

In accordance with **Stage-2** of the bidding process, the following bidders submitted their Technical Proposals, including financial proposals encompassing the price per installation point and breakdown of price per component.

Sr.	Bidder
1.	M/s ISSM Labelling Solutions (Pvt) Ltd
2.	M/s Obsidian

Upon submission, the proposals were evaluated based on the Technical Evaluation Criteria specified in Section V. All two (02) vendors successfully achieved the minimum technical evaluation score of 70%, are considered compliant/technically qualified, and have been recommended by the Committee.

Sr.	Bidder	Compliance with Mandatory Criteria	Technical Score/ Marks (Maximum marks 100)
1.	M/s ISSM Labelling Solutions (Pvt) Ltd	Compliant	75
2.	M/s Obsidian	Compliant	70

Note: The minimum technical score (St) required to pass is: Seventy (70) points / marks being 70% of total score i.e. 100 marks.

12. **Proof-of-Concept Testing**

Bidders were required to conduct mandatory Proof-of-Concept (POC) testing for proposed solutions at selected industry sites. After conducting evaluation with refer to technical criteria given in the relevant bidding document, the following bidders found technically qualified/responsive therefore, POC tests of **M/s ISSM Labeling and M/s Obsidian** were conducted on **15th September, 2026**. As per the test results of the POCs, following bidders successfully passed the POC requirements. The POC reports are attached at **Annexure-IV**.

1.	M/s ISSM Labelling Solutions (Pvt) Ltd
2.	M/s Obsidian

13. **Bids Accepted as “Non-responsive/Non-Technically Qualified” to the ITB**

During technical bid evaluation process, no bidder/vendor was declared as “Non-responsive/non-technically qualified”


Waqas Ahmed Langah
Secretary (Budget & Expenditure)
Federal Board of Revenue
Islamabad

TECHNICAL BID OPENING SHEET

Tender Reference No:

1(6) IR/TDU/2026

Project Title:

**AUTHORIZED VENDORS FOR SUPPLY, INSTALLATION AND
MAINTENANCE OF PRODUCTION MONITORING SYSTEM IN
IRON AND STEEL SECTOR (Stage-2)**

Technical Bid Opening Date/ Time:

14th Sept-26, 2026 at 11:30 a.m.

S.No.	Name of Firm	Name of Representative	Bid Submission (Hard/Soft)	Bid Security submission	Financial Bid submission	Signature
1.	M/s ISSM Labelling	Zaeshan Kiyani	Yes ^{USB} Yes		Yes	<i>Zaeshan Kiyani</i>
2.	M/s Obsidian		Yes NO		Yes	No. Rep. from the bidder attended the meeting.
3.						
4.						
5.						
6.						
7.						
8.						
9.						

Waqas Ahmed Langan
Waqas Ahmed Langan
Secretary (Budget & Expenditure)
Federal Board of Revenue
Islamabad

Fazfakh Amir Ghani
Fazfakh Amir Ghani
Secretary (Administration)

- Costs for software licenses: Integrated Development Environment (IDE) such as Visual Studio, AI/Computer Vision libraries, or database management tools. Nonetheless, it is highly recommended Open-source tools are used where possible.
- Costs for software licenses involving hardware: necessary software/firmware needed for developing and maintaining the different hardware such as Industrial Cameras, Laser Counters, or Thermal Sensors.
- Costs for Operating System: Windows IoT/Professional license in installed machines (IPCs) or Windows Server for hosting the application.
- Costs for maintenance consumables: Industrial lens cleaning kits, sacrificial protective glass (to protect sensors from pitting/sparks), replacement air filters for cooling cabinets, and desiccant packs (for humidity control inside enclosures).

D. Technical Evaluation Criteria

01.

TECHNICAL EVALUATION CRITERIA

Sr. No.	Evaluation Metric	Evaluation Criteria	Maximum Marks	Supporting Documents
1	Directly Relevant Solution Deployment	Proven deployment of the same or very similar solution in live manufacturing environments (preferably heavy industry). Focus on actual operational use, not pilots. • 2 or more live deployments – 10 marks • 1 live deployment – 5 marks • No live deployment – 0 marks	10	Purchase Orders, Completion Certificates, Go-Live Letters
2	Harsh Environment Performance Experience	Demonstrated experience of system performance in high heat, dust, vibration, or EMI-prone environments (Iron, Steel, Cement, Power, etc.).	10	Experience Certificates, Site Details, Photographic Evidence
3	End-to-End System Integration Capability	Practical capability to deliver an end-to-end system, including: • Edge hardware • Networking • Central servers / cloud • Dashboards & reporting	10	Architecture Diagrams, Integration Details, Deployment References

4	Field Robustness & Industrial Readiness (CORE SUBJECT)	Primary evaluation criterion. Assessment of how well the solution survives and performs in real industrial conditions, including: • Heat, dust, vibration resistance • Camera / sensor protection & mounting strategy • EMI / electrical noise shielding • Tamper detection & prevention • Maintainability during live operations	40	Detailed Engineering Design, Industrial Specs, Field Drawings, Bill of Materials
5	Implementation, Continuity & Support Model	Ability to deploy, sustain, and recover the system in real operations: • Realistic implementation timeline • Roll-out strategy with minimal production disruption • Disaster recovery & failover design • On-site & remote support model • Spare parts & response time commitments	30	Project Plan, DR Strategy, Support & SLA Documentation
	Grand Total	Total Technical Evaluation Score	100 Marks	

Upon submission of proposals, bidders will be evaluated based on the Technical Evaluation Criteria specified above and the POC test. Vendors must achieve a minimum technical evaluation score of 70% and successfully meet the defined POC criteria. Any proposal that does not meet this minimum threshold will be considered non-compliant and will not be further considered in the bidding process

02. The Project Plan shall comprehensively address:

Project Organization and Management Plan

Roles & Governance: A detailed project governance structure shall be provided, clearly identifying key roles including the Project Manager, Technical Lead (Industrial Automation / Video Analytics / Sensor Integration Specialist), and Site Engineers / Field Support Staff. The bidder shall define a clear governance and communication model, specifying reporting lines, decision-making authority, and coordination mechanisms with FBR and the management of participating iron and steel manufacturing units, including procedures for approvals, change management, technical coordination, and operational reporting.

AUTHORIZED VENDORS FOR SUPPLY, INSTALLATION AND MAINTENANCE OF PRODUCTION MONITORING SYSTEM IN IRON AND STEEL SECTOR (STAGE-2)

TECHNICAL BIDS EVALUATION SHEET

(Upon submission of proposals, bidders will be evaluated based on the Technical Evaluation Criteria specified above and the POC test. Vendors must achieve a minimum technical evaluation score of 70% and successfully meet the defined POC criteria. Any proposal that does not meet this minimum threshold will be considered non-compliant and will not be further considered in the bidding process)

r. No.	Evaluation Metric	Evaluation Criteria	Maximum Marks	M/s ISSM Labelling Solutions (Pvt) Ltd	M/s Obsidian
1.	Directly Relevant Solution Deployment	Proven deployment of the same or very similar solution in live manufacturing environments (preferably heavy industry). Focus on actual operational use, not pilots. • 2 or more live deployments – 10 marks • 1 live deployment – 5 marks • No live deployment – 0 marks	10	10	10
2.	Harsh Environment Performance Experience	Demonstrated experience of system performance in high heat, dust, vibration, or EMI-prone environments (Iron, Steel, Cement, Power, etc.).	10	10	10
3	End-to-End System Integration Capability	Practical capability to deliver an end-to-end system, including: • Edge hardware • Networking • Central servers / cloud • Dashboards & reporting.	10	10	10
4.	Field Robustness & Industrial Readiness (CORE SUBJECT)	Primary evaluation criterion. Assessment of how well the solution survives and performs in real industrial conditions, including: • Heat, dust, vibration resistance •	40	25	25

		Camera / sensor protection & mounting strategy • EMI / electrical noise shielding • Tamper detection & prevention • Maintainability during live operations			
5.	Implementation, Continuity & Support Model	Ability to deploy, sustain, and recover the system in real operations: • Realistic implementation timeline • Roll-out strategy with minimal production disruption • Disaster recovery & failover design • On-site & remote support model • Spare parts & response time commitments	30	20	15
Total Marks/Scored Marks			100	75	70
Technical qualification status				Compliant	Compliant

IRON & STEEL SECTOR

Proof of Concept Stage-II Report

Date: 15th September, 2026

Vendor : M/s ISSM Labelling Solution (Pvt) Limited

Facility: Karachi Steel (Composite Unit), I-10, Islamabad Industrial Area, Islamabad

Officers Attended POC: Shiraz Ali, Abdur Rehman, Ali Saeed, Sajal Tariq, Kamran Arshad, Fakhar Sharif, Muhammad Saqib Bajwa

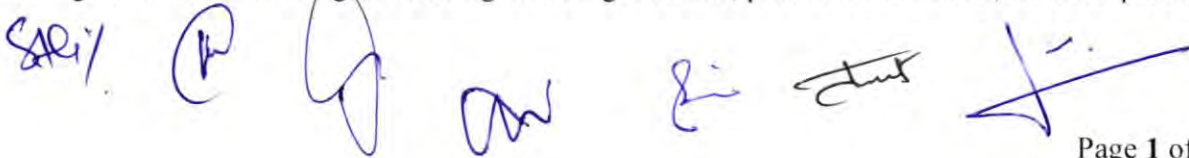
Objective:

The primary objective of the Stage-2 Proof of Concept (POC) was to evaluate the vendor's proposed end-to-end Production Monitoring Solution for the Iron and Steel Sector through an actual on-site demonstration at the Karachi Steel manufacturing facility. The POC was designed to assess the technical capability, operational reliability, accuracy, integration and completeness of the solution against the requirements and evaluation criteria prescribed in the RFP.

For Stage-2, the vendor was required to demonstrate an integrated four-stage production monitoring architecture, covering the complete production and dispatch cycle from billet/ingot stage of steel production to final weighment at the weighbridge. The solution was therefore evaluated with particular reference to the following functional stages identified and published in the revised RFP:

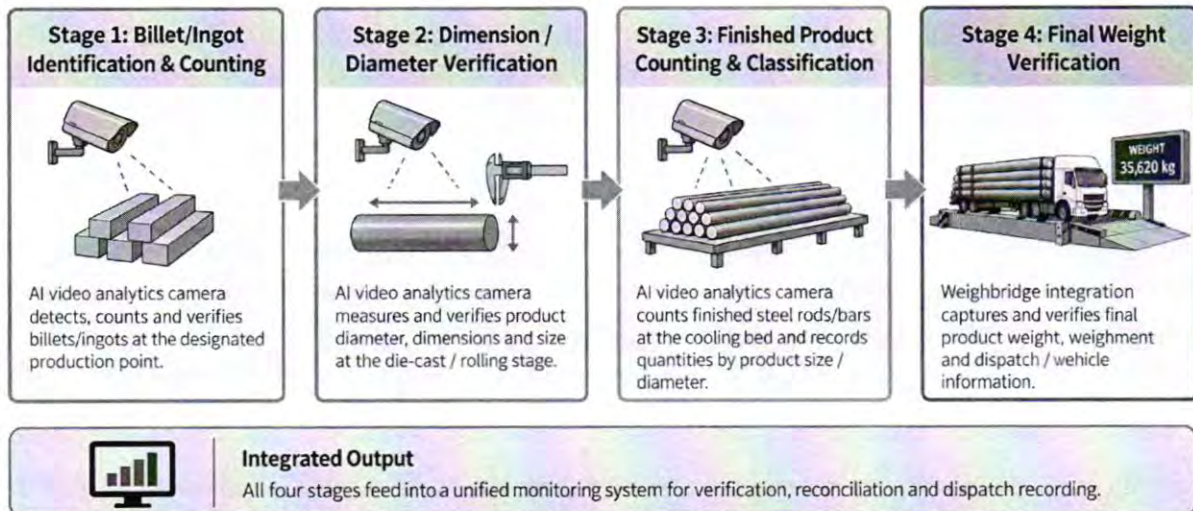
1. **Billet/Ingot Identification and Counting:** Automated detection, counting and verification of billets and/or ingots at the designated production point through the first AI-enabled video analytics intervention.
2. **Product Dimension/Diameter Verification:** Automated measurement and verification of the diameter, dimensions and/or size of the steel product at the relevant die-cast or rolling stage through the second AI-enabled video analytics intervention.
3. **Finished Product Counting and Classification:** Automated counting of finished steel rods/bars at the cooling bed through the third AI-enabled video analytics intervention, together with identification and recording of production quantities according to the relevant product size, diameter or other prescribed classification.
4. **Final Weight Verification through Weighbridge Integration:** Automated capture and verification of the actual weight of finished steel products through hardware- or software-based integration with the existing weighbridge(s) of the steel manufacturing unit, including recording of weighment, vehicle and dispatch-related information.

The Stage-2 POC was also intended to establish whether these four intervention points operate as an integrated and traceable monitoring chain, rather than as isolated monitoring applications. Accordingly, the vendor was required to demonstrate automated correlation and reconciliation of data generated at each stage, including billet/ingot counts, product dimensions, finished-product



counts and final weighbridge measurements, so that production quantities can be independently validated and abnormal variations, inconsistencies or possible discrepancies can be identified.

Iron & Steel Production Monitoring – Four-Stage Monitoring Flow



In addition, the assessment covered the vendor's capability to provide time-stamped and unit-specific production records, secure local processing and buffering, uninterrupted data capture during connectivity failures, secure transmission of data to FBR, real-time dashboard visibility, system-generated alerts, audit trails and supporting electronic/video evidence, wherever applicable. The POC also examined the resilience of the solution against device failure, camera or sensor obstruction, weighbridge integration failure, connectivity disruption, unauthorized interference and other abnormal operating conditions.

SKU Tested: Steel Billets/Ingots, Rebars (long rods).

Key Equipment Deployed during POC:

Equipment Name	Make / Model	Key Functions	Specifications / Features
Camera	Hikvision	Captures real-time video footage for AI-based counting and site monitoring.	IP-based, 1080P PoE camera; quantity: 4 units.
NVR 8CH	Hikvision	Records and manages live feeds from connected IP cameras; provides centralized video storage.	8-channel network video recorder with PoE support; quantity: 1 unit.
2TB Hard Drive	Western Digital	Provides on-site storage for recorded video footage on the NVR.	2TB surveillance-grade HDD; quantity: 1 unit.
Compute Unit	GPU-Nvidia	Provides hardware acceleration for AI	5060Ti GPU Cor i9 Intel, 14900 32 GB RAM

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	CPU-Intel	inference and computer vision processing.	32 GB RAM 1 TB NVMe
Media Converter	Gtek	Converts optical signals to electrical signals for long-distance data transmission over fiber.	Fiber-to-Ethernet media converter; quantity: 2 units.
PoE Switch 4 Port	Autoconnect	Provides power and network connectivity to IP cameras over Ethernet.	4-port Power-over-Ethernet switch; quantity: 1 unit.
PoE Switch 8 Port	Autoconnect	Provides power and network connectivity to multiple IP cameras over Ethernet.	8-port Power-over-Ethernet switch; quantity: 1 unit.
LED Display	Lenovo	Displays live camera feeds, AI detection results, and dashboard information for on-site monitoring.	LED monitor for system visualization; quantity: 1 unit.
Fiber Optic Cable		Carries video and network signals over long distances between cameras and the NVR.	Single-mode/multi-mode fiber optic cable; approx. 200 meters.

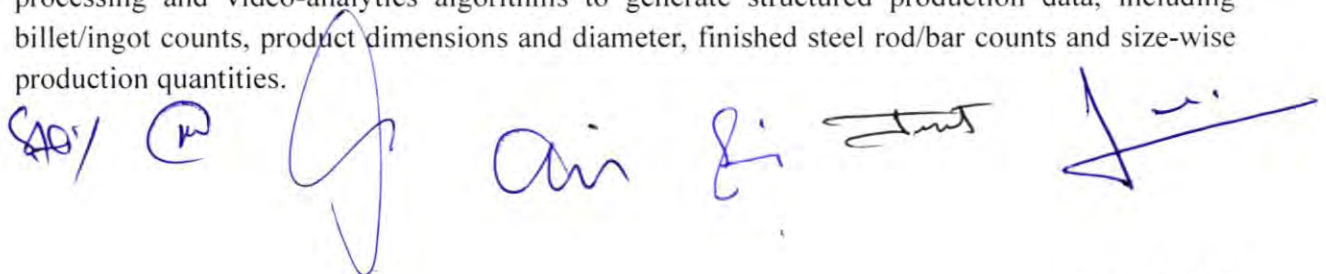
Industrial Video-Analytics based Production Counting Solution for Steel melting and Re-Rolling units:

1. Solution Topology and Overview

The proposed production monitoring solution is based on an integrated **four-stage monitoring architecture** utilizing Industrial Video Analytics (VA) Cameras and weighbridge integration at critical points of the steel manufacturing and dispatch process.

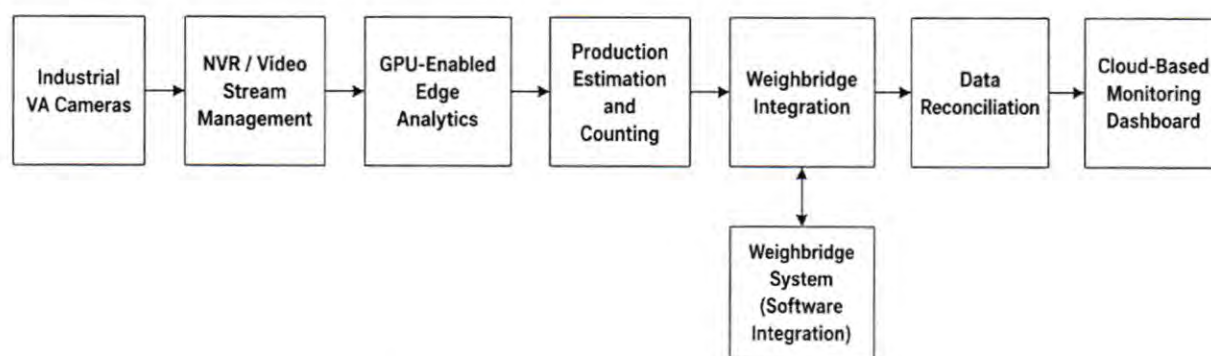
At the **first stage**, an AI-enabled Video Analytics Camera is deployed at the billet/ingot production point to automatically detect, identify, count and verify billets and/or ingots produced. At the **second stage**, a separate AI-enabled Video Analytics Camera is installed at the relevant die-cast or rolling stage to automatically measure and verify the diameter, dimensions and/or size of the steel product. At the **third stage**, another AI-enabled Video Analytics Camera monitors the cooling bed to automatically count finished steel rods/bars and classify the recorded production according to the relevant product size, diameter or other prescribed parameters.

The live video streams generated at these intervention points are recorded and managed through the **Network Video Recorder (NVR)** and processed through a GPU-enabled edge-computing device deployed within the factory premises. The edge-processing environment applies image-processing and video-analytics algorithms to generate structured production data, including billet/ingot counts, product dimensions and diameter, finished steel rod/bar counts and size-wise production quantities.



At the **fourth stage**, the solution is integrated, through hardware- or software-based connectivity, with the factory weighbridge to automatically capture and verify the actual weight of finished steel products at the time of dispatch. The weighbridge integration records relevant weighment information, including gross weight, tare weight, net product weight, vehicle details and other prescribed dispatch information.

The production and dispatch data generated across all four intervention points is securely transmitted to a **centralized web-based monitoring dashboard**, providing authorized users with real-time visibility of production, product dimensions, finished-product quantities, weighbridge measurements and dispatch activity. The system further performs automated reconciliation of billet/ingot production, product dimensions, finished steel rod/bar counts and final weighbridge measurements to identify abnormal variations, inconsistencies or discrepancies across the production-to-dispatch cycle.

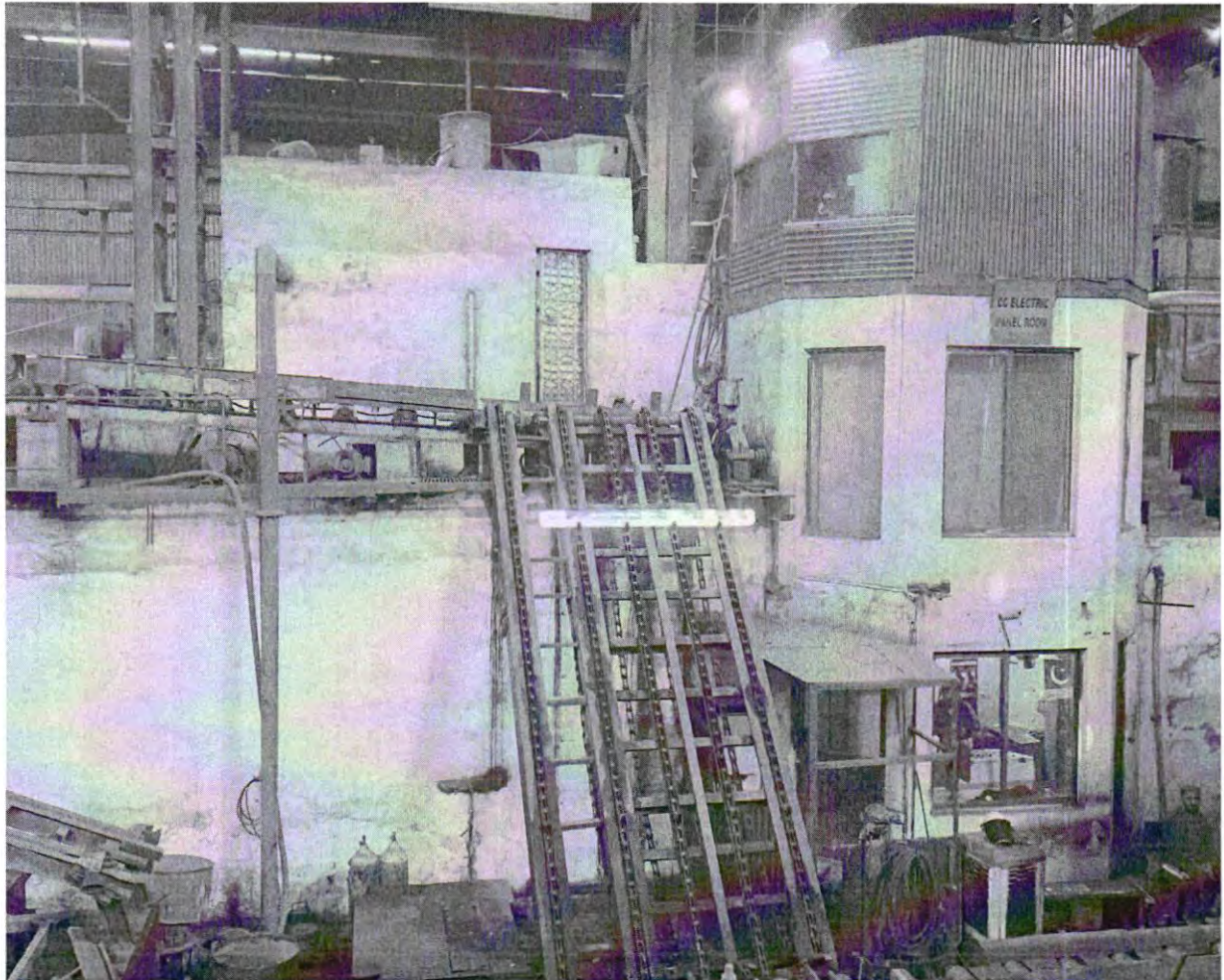


2. Integration/Intervention Points

a) Intervention Point 1: Video Analytics Camera at the Billet Counting Stage

The first Video Analytics Camera has been deployed at the billet production stage. At this point, billets/ingots are produced after scrap is melted in the furnace and cast into semi-finished billets/ingots. The VA camera captures and counts each billet as it exits the billet production process. It also records the visible dimensions, particularly the approximate length and cross-sectional size of the billet (as collected from the factory production team), for further analytical processing.

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Billet Produced after Melting Scrap – First Benchmark Point

The billets/ingots produced by a steel unit may vary in length, dimensions and approximate weight. These hot billets/ingots are passed through multiple rolling and pressing stages before being converted into a die-cast machine for final shape and a specific size finished steel bar.

The data captured at this stage is used as the primary production input for estimating the quantity and approximate weight of the finished steel bars that can be produced from the billets. The system records the following information:

- Number of billets/ingots produced
- Approximate length of each billet/ingot
- Visible cross-sectional dimensions
- Estimated weight of the billet/ingot
- Date and time of production

The billet/ingot-stage data provides the initial production benchmark against which subsequent rolling-stage and dispatch-stage information will be reconciled.

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Analytics > Billet-estimations

Billet Estimations

Expected roll output per billet length and SKU size

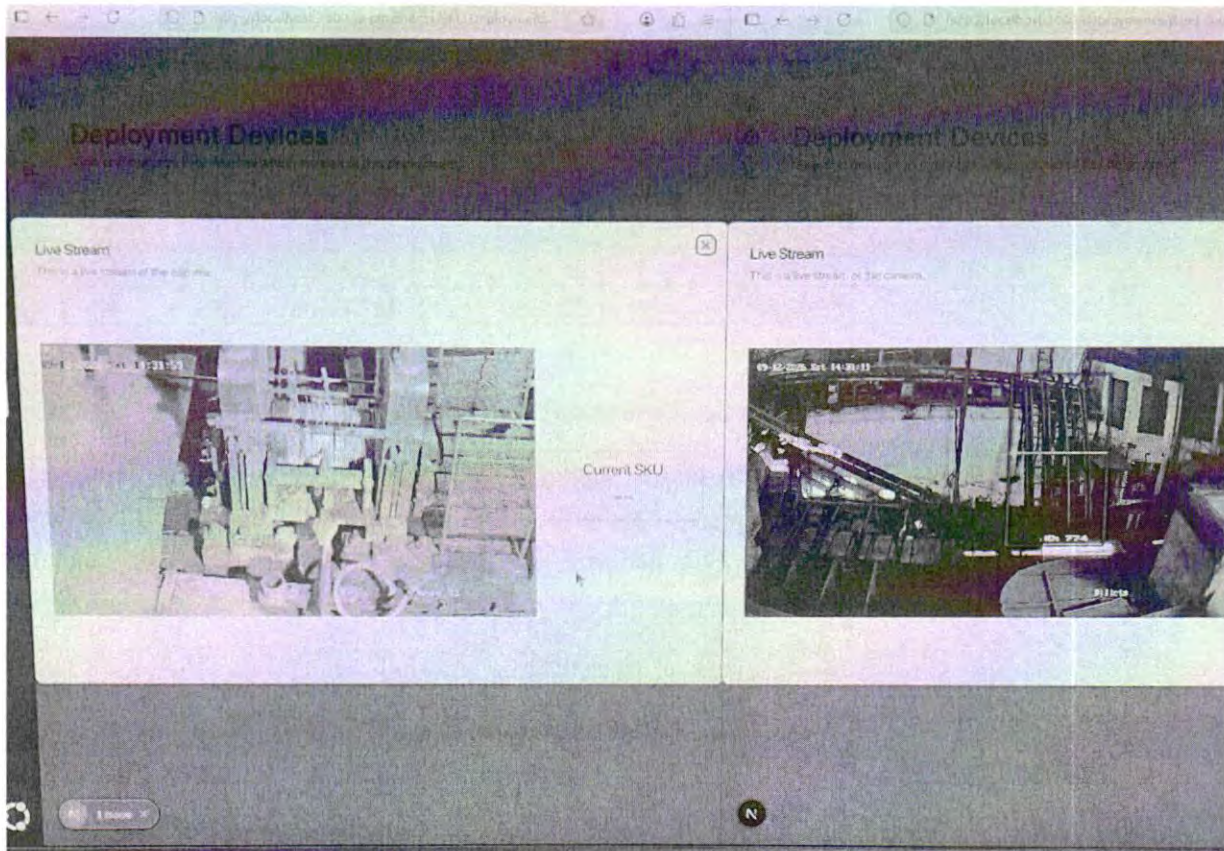
Estimations

Billet Length	SKU	Pods
75 inches	25 mm	1 - 122 feet
81 inches	12 mm	4 - 122 feet, 1 - 85 feet
87 inches	19 mm	2 - 122 feet
91.5 inches	16 mm	3 - 122 feet
93 inches	10 mm	7 - 122 feet, 1 - 85 feet
96 inches	20 mm	2 - 122 feet
124 inches	32 mm	1 - 122 feet

b) Intervention Point 2: Video Analytics Camera at the Rolling Die or Groove Setting

The second Video Analytics Camera has been installed at the rolling mill die or groove-setting point. This die-cast machine is manually configured by factory personnel according to the required diameter or size of steel bars to be produced as indicated below:

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Steel Rod Die-Casting Machine for production of specific size steel bars

The camera captures the selected die, groove or machine setting corresponding to the particular diameter of steel rod under production. Through image recognition and analytics, the system identifies the relevant production size and associates it with the billet/ingot data captured at intervention point-1 of the billet/ingot stage capture.

The intervention enables the system to determine:

- The steel bar diameter or size being produced
- The relevant die or groove selected on the rolling machine
- The time during which a particular size remains under production
- The relationship between pressed billet input and finished rebar (long rod) dimensions.

The die or groove-setting data is combined with the billet/ingot length, dimensions and count captured at Intervention Point 1. This enables the analytics engine to estimate the number and approximate weight of finished steel bars of different diameters that may be produced during a particular production period.

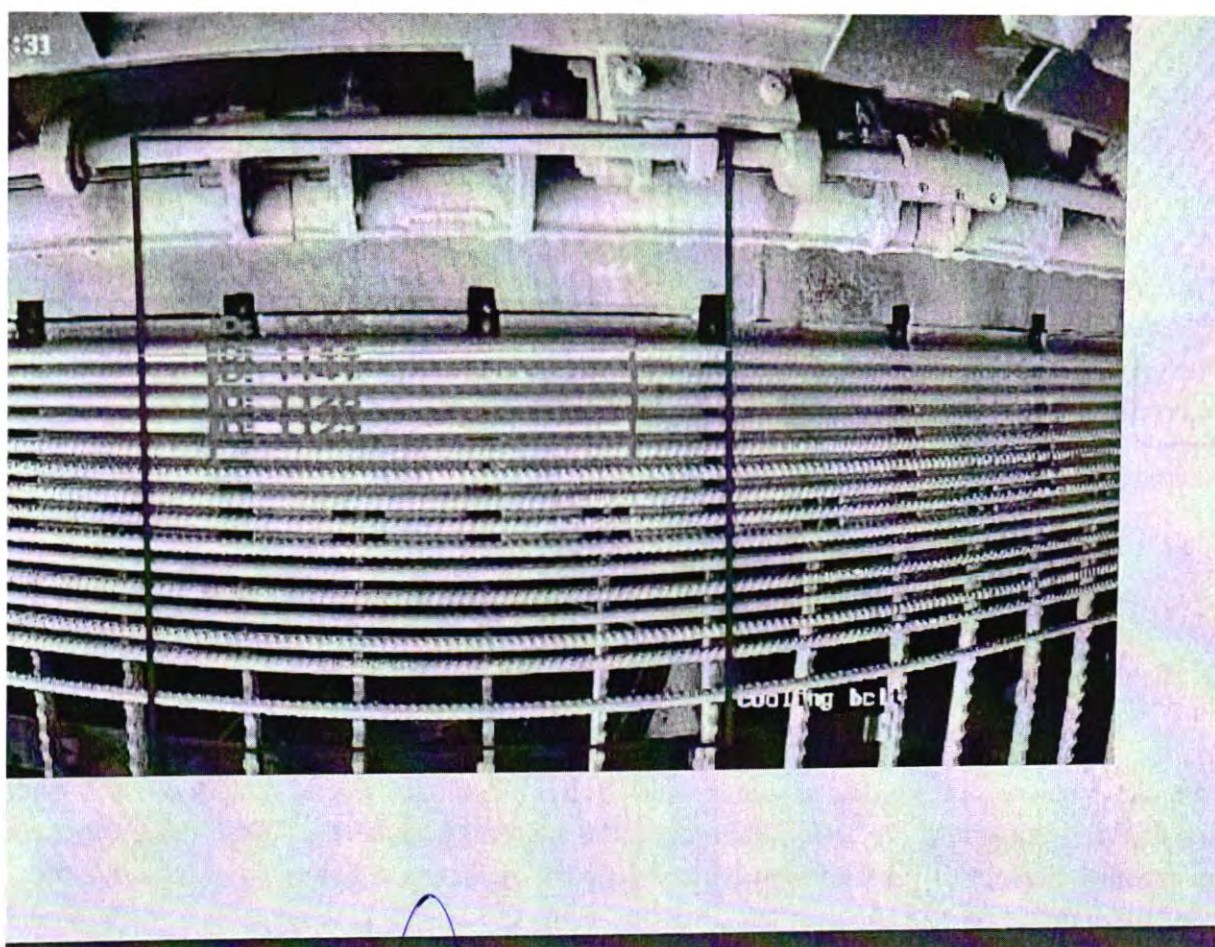
Where multiple steel bar sizes are produced during the same day, the system maintains separate production calculations for each identified size based on the corresponding machine-setting period.

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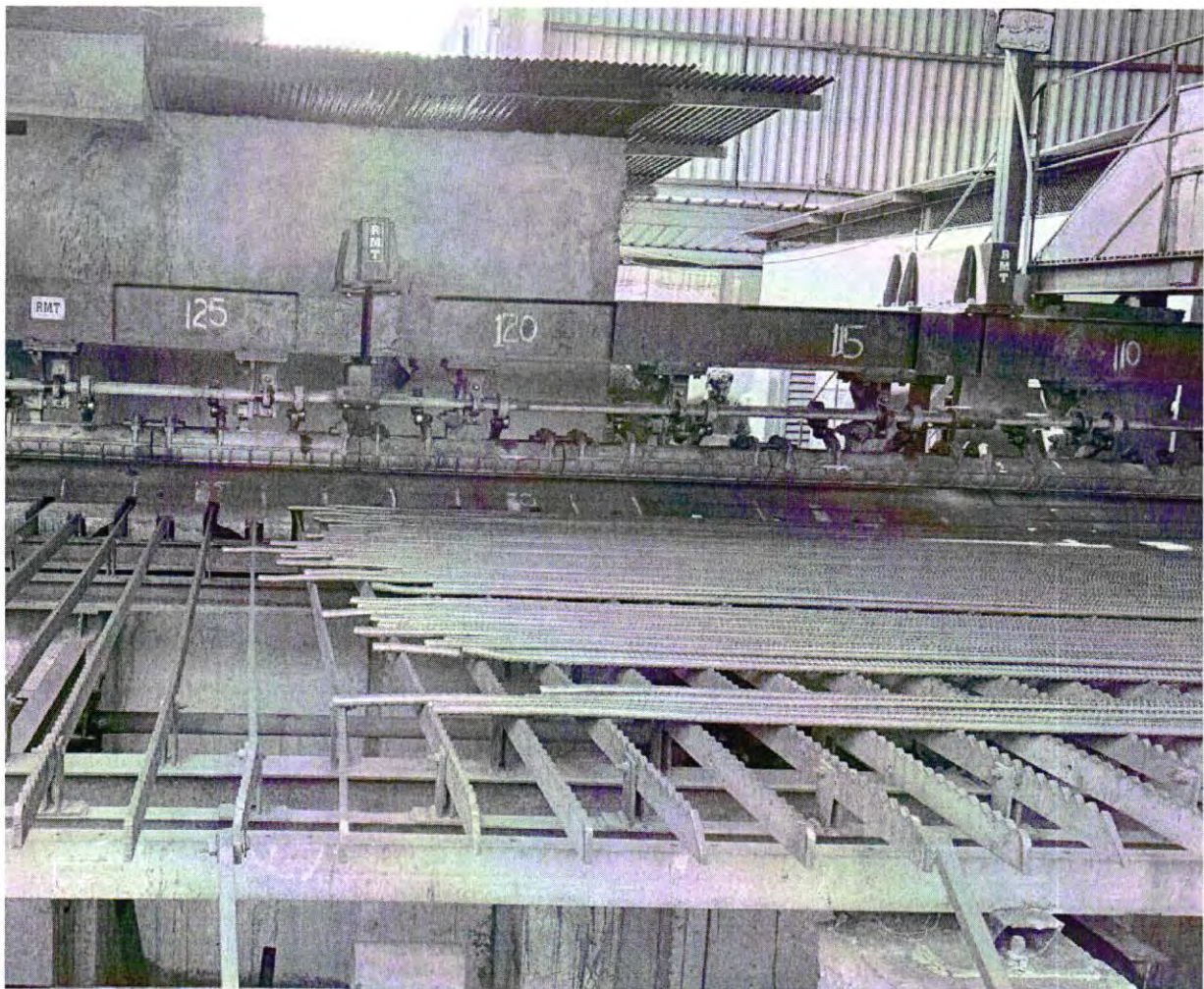
S.No	Billet-Size	Billet Weight	SKU	Length	No of Rods
1	93 Inch	182 Kg	10 mm	122 Feet	7
2	81 Inch	159 Kg	12 mm	122 Feet	4
3	92.5 Inch	181 Kg	16 mm	122 Feet	3
4	87 Inch	171 Kg	19 mm	122 Feet	2
5	96 Inch	189 Kg	20 mm	122 Feet	2
6	75 Inch	148 Kg	25 mm	122 Feet	1
7	124 Inch	242 Kg	32 mm	122 Feet	1

c) Intervention Point 3: Video Analytics Camera at the Final Cooling Bed

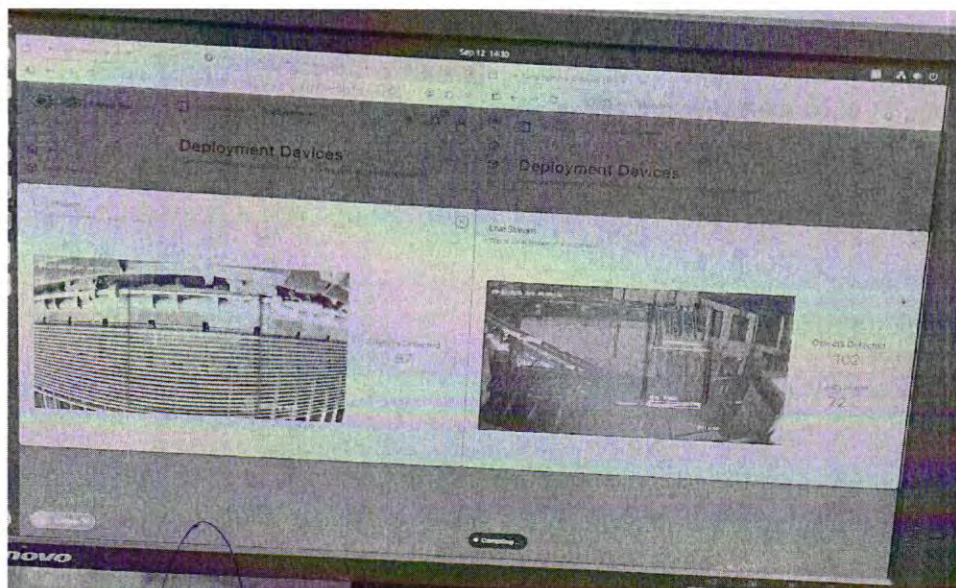
The third Video Analytics Camera has been installed at the cooling bed, where the final rebars are landing for cooling and bundling purposes. This is the stage at which the finished steel bars exit the rolling line, are placed on the cooling bed and are subsequently grouped into bundles for storage or dispatch.



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The camera is mounted at a suitable distance and angle to capture the entire cooling-bed area and monitor the finished steel bars as they are dropped, aligned and bundled.



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The standard production length of steel bars at the monitored unit is approximately **120 feet**, subject to the actual production configuration and cutting requirements of the factory. The Video Analytics Camera captures the visible length, quantity and movement of finished bars on the cooling bed.

At this intervention point, the system performs the following functions:

- Counts the finished steel bars reaching the cooling bed
- Identifies the diameter or size of the bars captured at intervention point-2 at die-casting machine
- Confirms the standard or configured bar length
- Records the time and production batch;
- Monitors the formation of bundles;
- Detects abnormal gaps or interruptions in production; and
- Compares the finished-bar output with the billet input recorded at intervention point-1 using the approximation method and fixed rule-based formula for all the SKUs.

The data from the cooling bed acts as a secondary production verification point. It confirms that the billets captured at the first intervention point have been converted into finished steel bars and allows the system to compare the expected output with the actual number of bars reaching the final production stage.

d) Intervention Point 4: Integration with the Weighbridge for Actual Dispatch Weight

The fourth intervention point consists of integration with the weighbridge installed at the factory exit or dispatch area. The purpose of this intervention is to capture the actual weight of finished steel products leaving the factory premises.

The vendor has implemented soft integration with the weighbridge software being deployed at the factory out-gate. Under this arrangement, the production monitoring solution receives the weighbridge transaction data directly from the weighbridge software.

The integrated system captures:

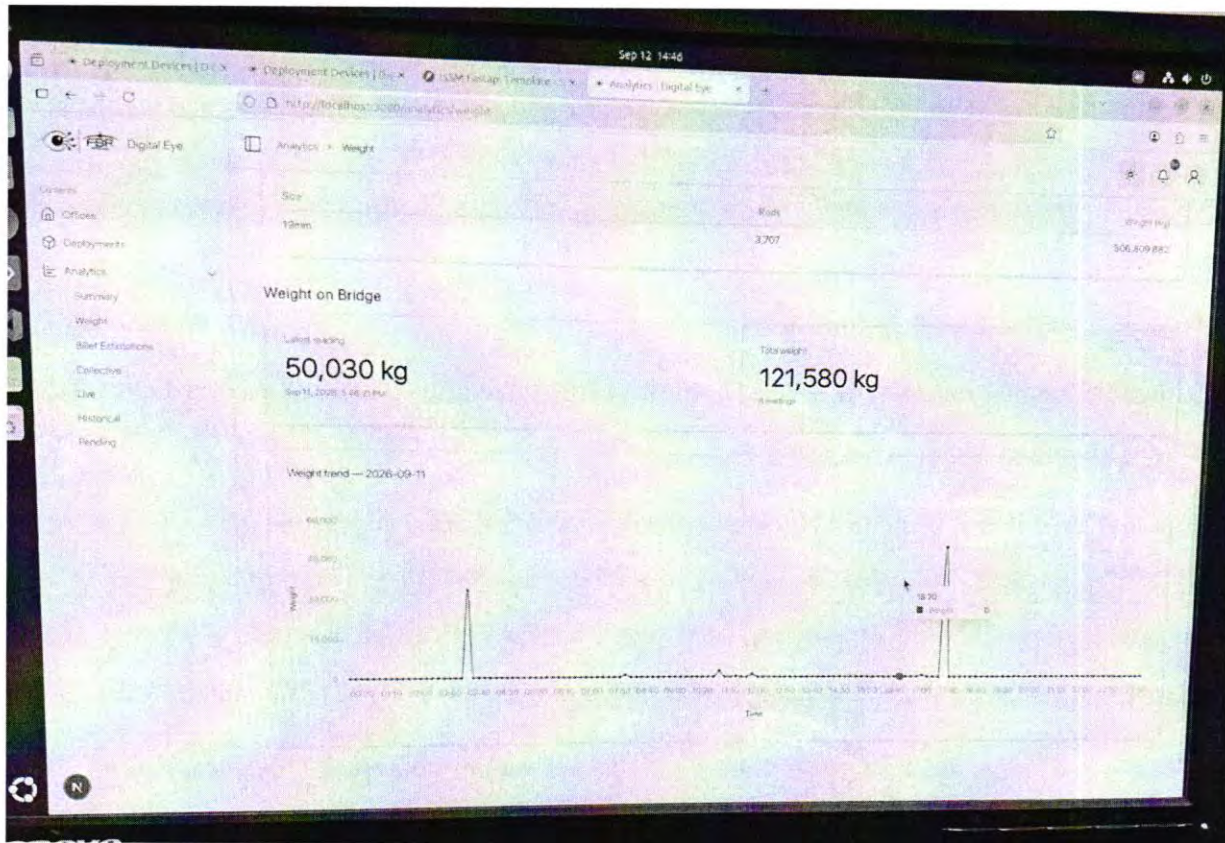
- Gross vehicle weight
- Tare weight of the vehicle
- Net weight of the steel consignment being shipped from factory
- Date and time of dispatch

The net dispatched weight is calculated as follows:

Net Steel Weight = Gross Loaded Vehicle Weight – Tare Vehicle Weight

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The vendor successfully implemented the software-based weighbridge integration and demonstrated the functionality to the participants of the POC. The actual net weight captured from the weighbridge provides the final and independently verifiable measure of steel rods/rebars dispatched from the factory.



3. Analytical Framework of the Video Analytics Solution Demonstrated during POC

The production monitoring solution captures production data at multiple stages and calculates the weight of long steel bars through a two-stage verification mechanism.

Stage 1: Estimation of Production through Video Analytics

At the first stage, the system calculates the approximate quantity and weight of steel produced through data captured from the production line.

The calculation uses the following inputs:

1. Number and dimensions of billets/ingots captured at intervention point-1
2. Estimated weight of the billets/ingots (feed into system as per factory SKUs)
3. Die or groove setting captured at intervention point-2
4. Diameter of steel bars captured at intervention point-2

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5. Standard or observed length of finished bars at intervention point-3
6. Number of finished bars captured at the cooling bed

The billet/ingot information and selected rod diameter are combined to calculate the approximate production of long steel bars of different sizes using approximation method. Where the diameter and length of a finished steel bar are known, its theoretical weight may be estimated using a standard engineering formula or an approved weight-per-metre table. The calculated weight is then multiplied by the number of bars detected at the cooling bed.

Accordingly, the system calculates estimated production through either of the following methods:

Method A: Billet-Based Estimation

Estimated Finished Production = Total Estimated Billet Weight – Standard Process Loss (1%)

Method B: Finished-Bar-Based Estimation

Estimated Production Weight = Number of Bars × Standard Bar Length × Standard Weight per Unit Length

The estimated production is maintained separately for each identified diameter or product size.

Stage 2: Verification through Actual Weighbridge Weight

At the second stage, the system captures the actual net weight of steel products leaving the factory through direct integration with the weighbridge software.

The weighbridge weight represents the physical quantity of finished steel dispatched from the factory premises. This is also expected to correspond with the quantity recorded in the factory's ERP, stock records, dispatch documentation and tax invoices.

The system compares the production estimated through Video Analytics at Stage 1 with the actual net dispatch weight captured at Stage 2.

The reconciliation may be expressed as:

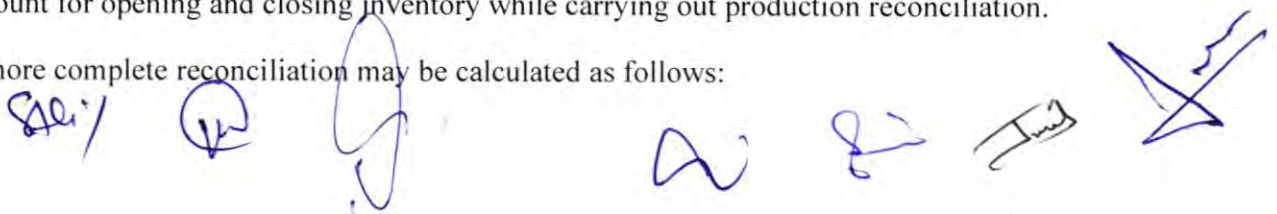
$$\text{Variance} = \text{Estimated Production Weight} - \text{Actual Dispatched Weight}$$

The variance percentage may be calculated as:

$$\text{Variance Percentage} = (\text{Variance} \div \text{Estimated Production Weight}) \times 100$$

However, production and dispatch may not always occur on the same day. Finished goods may remain in stock and be dispatched on a subsequent date. Therefore, the system should also account for opening and closing inventory while carrying out production reconciliation.

A more complete reconciliation may be calculated as follows:



$$\text{Expected Closing Stock} = \text{Opening Stock} + \text{Estimated Production} - \text{Actual Dispatches}$$

The expected closing stock may then be compared with the finished-goods inventory recorded in the unit's ERP or stock register.

4. End-to-End Data Reconciliation

The system performs multi-stage reconciliation using the following data sources:

Data Source	Information Captured	Purpose
Billet/ingot-Stage VA Camera	Billet count, length and dimensions	Estimation of raw production input
Die/Groove VA Camera	Diameter or product size	Identification of the steel-bar specification
Cooling-Bed VA Camera	Finished-bar count and length	Verification of final production output
Weighbridge Software	Gross, tare and net dispatch weight	Confirmation of actual quantity leaving the factory

The system cross-checks the quantity estimated at the billet and cooling-bed stages against the actual quantity dispatched through the weighbridge. It can also compare the weighbridge dispatch weight with the quantity recorded in the unit's ERP and reported through the applicable tax-invoicing system.

STAGE-II POC Evaluation of Four Stage AI based Video Analytics Solution:

Sr. No.	Criterion	Test Description	Marks Awarded to Vendor
1	Counting Accuracy	The Core Counting Test: The vendor's solution will be compared against the Mill's Weighbridge or Manual Count for a batch of production (100 Billets/ingots or equivalent MTons of Rebars/Sheets/Girders etc). The solution shall demonstrate the different SKUs of Rebars/Billets/Ingots/Sheets/Girders) counting and weight measurement. Scoring: • 98% - 100% Accuracy: 15 Marks • 95% - 97.9% Accuracy: 10 Marks	15

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		• 90% - 94.9% Accuracy: 05 Marks • Below 90%: 0 Marks (Disqualified)	
2	Weighing Accuracy	The Weight Measurement Test: The Vendor's solution shall measure the weight produced by integrating with the factory weighbridge either through soft or hard integration. This captured weight at the weighbridge shall be cross checked and verified with the weight calculated at the initial three stages of AI Vision based cameras integration. The system shall calculate weight based on formula and analytics engine, while the same calculated weight shall be cross verified and check with the final weight at the weighbridge point. Scoring: • 98% - 100% Accuracy: 15 Marks • 95% - 97.9% Accuracy: 10 Marks • 90% - 94.9% Accuracy: 05 Marks • Below 90%: 0 Marks (Disqualified)	15
3	Environmental Endurance (Heat & Dust)	The Stress Test: Hardware (Cameras/Sensors) must be mounted in the actual production zone (e.g., facing the cooling bed or billet ejection path) where temperatures exceed 50°C and metallic dust is heavy. Requirement: The system must operate continuously for at least 48 hours without thermal shutdown, lens fogging, or sensor drift. Scoring: • No hardware failure/restart required: 10 Marks • Required cleaning/intervention > 1 time: 0 Marks	10
4	Object Differentiation (Scrap vs. Product)	The Logic Test: The system must demonstrate the ability to ignore non-production movements. The evaluator will simulate "noise" (e.g., a crane moving an empty ladle, a worker walking by, or scrap movement). The system shall be able to generate alerts in case of abnormal production stoppage or any other related event that can disturb the production count. Scoring: • System correctly ignores all non-product movements: 10 Marks • System falsely counts scrap/workers as "Production" (False Positives): Deduct 2 marks per error.	10









5	Real-Time Data Latency	The Connectivity Test: The evaluator will time the delay between the physical production event (e.g., Billet ejection) and its appearance on the FBR Dashboard. This time delay test shall demonstrate the normal processing time of a final steel bar landing on the cooling bed for bundling from the melting stage. Live reporting of the recorded time and stamp shall follow below test: Scoring: • Data appears within < 60 seconds: 10 Marks • Data appears within 1 - 5 minutes: 5 Marks • Data takes > 5 minutes: 0 Marks	10
6	Tamper & Failure Response	The Security & Resilience Test: The evaluator shall simulate fault and tamper conditions, including: a) Partial or full obstruction of camera/sensor view b) Power interruption or network disconnection Scoring: • System generates an instant "Tamper Alert" or "Offline Alarm" on the dashboard: 10 Marks • System fails silently (no alert generated): 0 Marks	5
		TOTAL MARKS	65

POC Conclusions and Observations:

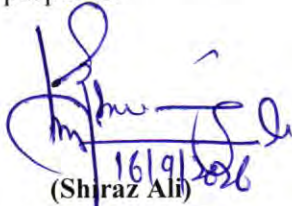
The proposed solution provides a comprehensive four-stage intervention mechanism for monitoring steel production from the initial melting process through final dispatch. Rather than relying on a single camera or production count, the system captures and verifies production at multiple critical points across the manufacturing process. At Stage 1, the solution identifies and counts the billets/ingots produced from the melting of scrap and estimates their corresponding production weight. At Stage 2, the system measures and verifies the diameter/dimensions of the material during the rolling process. At Stage 3, video analytics captures the final count and classification of steel rods/rebars being produced at the cooling bed and calculates the corresponding estimated finished-product weight in metric tons. Finally, at Stage 4, the solution integrates with the weighbridge to capture the actual net weight of the finished steel being dispatched.

The system subsequently reconciles the calculated production weight derived from the first three intervention stages with the actual weight recorded at the weighbridge, thereby establishing an independent cross-verification mechanism between production estimated through video analytics

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and the quantity physically dispatched. This multi-stage reconciliation enables discrepancies between estimated production and actual dispatch weight to be identified and provides greater assurance regarding the completeness and reliability of production data.

During the Proof of Concept (POC), the vendor successfully demonstrated all four intervention stages, including billet/ingot identification, diameter verification, finished steel bar/rebar counting at the cooling bed, and integration with the weighbridge. The reconciliation of the estimated production with the actual weighbridge data achieved an overall accuracy of approximately 99% during the POC, demonstrating the technical feasibility and effectiveness of the multi-layer verification approach. The direct weighbridge integration further strengthens the credibility of the solution by ensuring that the final reconciled production quantity corresponds with the actual quantity dispatched and recorded in the factory's ERP system for taxation and enforcement purposes.



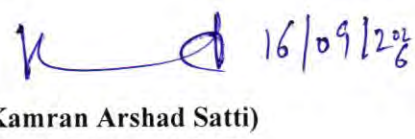
(Shiraz Ali)
Secretary (VCD)
TDU, FBR (HQ)



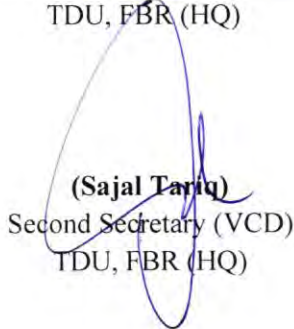
(Abdur Rehman)
Second Secretary (VCD)
TDU, FBR (HQ)



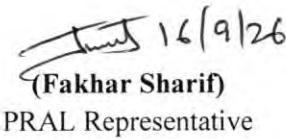
(Ali Saeed)
Second Secretary (VCD)
TDU, FBR (HQ)

 16/09/26

(Kamran Arshad Satti)
Second Secretary (VCD)
TDU, FBR (HQ)



(Sajal Tariq)
Second Secretary (VCD)
TDU, FBR (HQ)

 16/9/26

(Fakhar Sharif)
PRAL Representative



(Muhammad
Saqib Bajwa)
Assistant Director
TTS

IRON & STEEL SECTOR

Stage-II Proof of Concept Report

Date: 15th September, 2026

Vendor : M/s Obsidian Technologies

Facility: Pak Iron and Steel Casting (Composite Unit) – I-10/3 Islamabad.

Officers Attended POC: Shiraz Ali, Abdur Rehman, Ali Saeed, Sajal Tariq, Kamran Arshad, Fakhar Sharif, Muhammad Saqib Bajwa

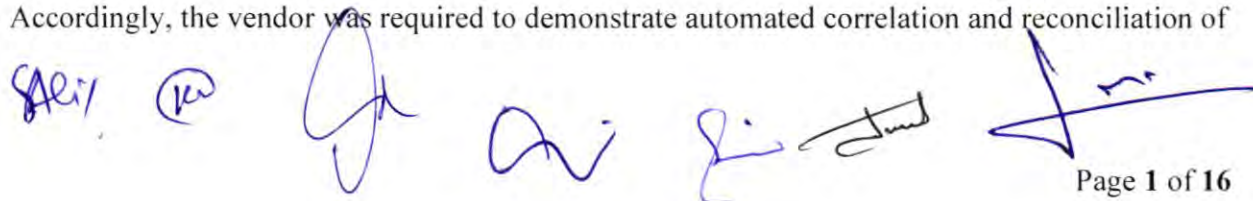
Objective:

The primary objective of the Stage-2 Proof of Concept (POC) was to evaluate the vendor's proposed end-to-end Production Monitoring Solution for the Iron and Steel Sector through an actual on-site demonstration at the Pak Iron and Steel Casting manufacturing facility. The POC was designed to assess the technical capability, operational reliability, accuracy, integration and completeness of the solution against the requirements and evaluation criteria prescribed in the RFP.

For Stage-2, the vendor was required to demonstrate an integrated four-stage production monitoring architecture, covering the complete production and dispatch cycle from billet/ingot stage of steel production to final weighment at the weighbridge. The solution was therefore evaluated with particular reference to the following functional stages identified and published in the revised RFP:

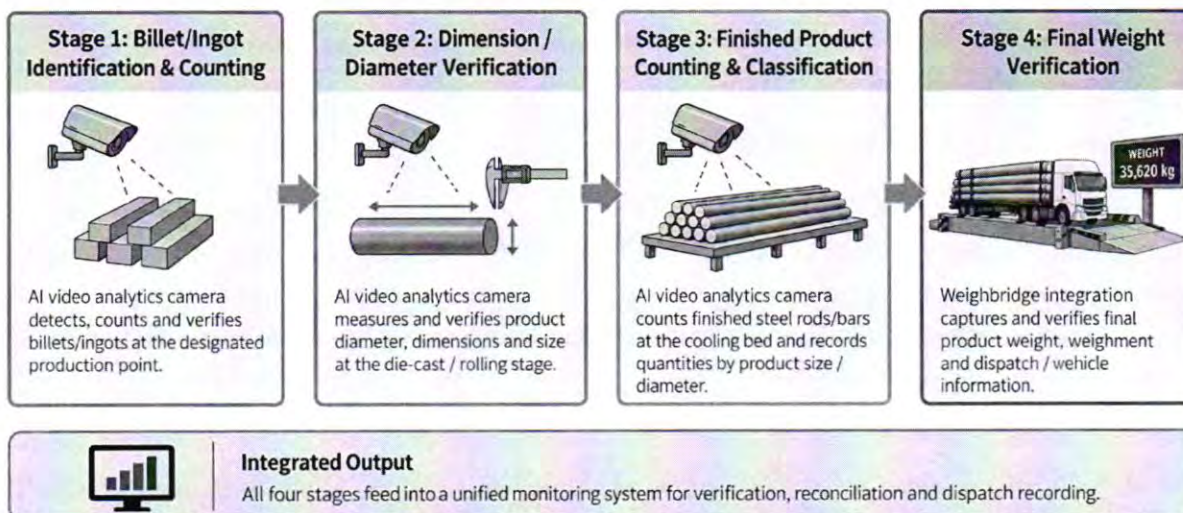
1. **Billet/Ingot Identification and Counting:** Automated detection, counting and verification of billets and/or ingots at the designated production point through the first AI-enabled video analytics intervention.
2. **Product Dimension/Diameter Verification:** Automated measurement and verification of the diameter, dimensions and/or size of the steel product at the relevant die-cast or rolling stage through the second AI-enabled video analytics intervention.
3. **Finished Product Counting and Classification:** Automated counting of finished steel rods/bars at the cooling bed through the third AI-enabled video analytics intervention, together with identification and recording of production quantities according to the relevant product size, diameter or other prescribed classification.
4. **Final Weight Verification through Weighbridge Integration:** Automated capture and verification of the actual weight of finished steel products through hardware- or software-based integration with the existing weighbridge(s) of the steel manufacturing unit, including recording of weighment, vehicle and dispatch-related information.

The Stage-2 POC was also intended to establish whether these four intervention points operate as an integrated and traceable monitoring chain, rather than as isolated monitoring applications. Accordingly, the vendor was required to demonstrate automated correlation and reconciliation of



data generated at each stage, including billet/ingot counts, product dimensions, finished-product counts and final weighbridge measurements, so that production quantities can be independently validated and abnormal variations, inconsistencies or possible discrepancies can be identified.

Iron & Steel Production Monitoring – Four-Stage Monitoring Flow



In addition, the assessment covered the vendor's capability to provide time-stamped and unit-specific production records, secure local processing and buffering, uninterrupted data capture during connectivity failures, secure transmission of data to FBR, real-time dashboard visibility, system-generated alerts, audit trails and supporting electronic/video evidence, wherever applicable. The POC also examined the resilience of the solution against device failure, camera or sensor obstruction, weighbridge integration failure, connectivity disruption, unauthorized interference and other abnormal operating conditions.

SKU Tested: Steel Billets/Ingots, Rebars (long rods).

Key Equipment Deployed during POC:

S.No	Component / Item Description	Indicative Requirements / Technical Specification	Unit	Qty
A.1 — EDGE COMPUTE & PROCESSING				
1	GPU Vision Workstation (Local Server)	CPU: Intel Core i7 (12th generation or later); RAM: 32 GB DDR5; Storage: 2 × 1 TB SSD configured in RAID 1 for data redundancy; GPU: NVIDIA RTX 5070 (12 GB GDDR6X) or higher, ≥3200 MHz memory, interface PCI Express 4.0 × 16; Network: 1 × Gigabit Ethernet (RJ45); PSU ≥1000 W 80+ Gold; tower / rack-mount chassis with filtered forced-air cooling. Runs all three machine-vision inference pipelines (cooling bed, billet, weighbridge) concurrently plus the sensor calculation service and dashboard.	No.	1
A.2 — MACHINE VISION CAMERAS				

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2	Industrial Machine Vision Camera — Cooling Bed	Type: industrial GigE / IP camera with PoE. 5 MP global shutter, 1/1.8"; Resolution 2592×1944 @ ≥30 fps (1080p @ 60 fps); colour with low-light performance; H.264 / H.265 / MJPEG; code rate >5 Mbps; C-mount varifocal lens sized so that a full rod head-to-tail is captured in one frame; global shutter mandatory to avoid smear on moving rods; IP66/IP67 erosion-protective housing; DC 12–24 V / PoE 802.3af.	No.	1
3	Industrial Machine Vision Camera — Billet Zone	Type: industrial GigE / IP camera with PoE. 5 MP global shutter, 1/1.8"; Resolution 2592×1944 @ ≥30 fps (1080p @ 60 fps); colour with low-light performance; H.264 / H.265 / MJPEG; code rate >5 Mbps; C-mount varifocal lens sized so that a full rod head-to-tail is captured in one frame; global shutter mandatory to avoid smear on moving rods; IP66/IP67 erosion-protective housing; DC 12–24 V / PoE 802.3af.	No.	1
4	Industrial Machine Vision Camera — Weighbridge	5 MP IP camera, ≥30 fps, PoE, IP66/67, motorised varifocal lens, colour night vision / IR, WDR ≥120 dB for mixed indoor–outdoor lighting at the weighbridge platform; H.264/H.265; ONVIF compliant.	No.	1
5	USB Web Camera — Weighbridge Indicator Screen (OCR)	4K UHD 3840×2160 @ 30 fps, 1080p @ 60 fps; ≥8.5 MP sensor with 1.4 µm pixels; auto-focus with close-focus capability; HDR / Right Light-class low-light correction; adjustable FOV 65°/78°/90°; dual noise-cancelling microphones; UVC / plug-and-play (no driver dependency); USB-C 3.0 connection; privacy shutter; tripod-threaded mount.	No.	1
6	USB Web Camera — Operator / Control Station	Identical specification to the above (4K UHD, auto-focus, HDR, UVC, USB-C) — second unit for the control-room operator station and as hot standby for the weighbridge screen-capture channel.	No.	1
A.3 — SENSING & MEASUREMENT				
7	Laser / Optical Micrometer — Diameter Measurement	Non-contact through-beam laser / optical micrometer for continuous rod diameter measurement at full line speed. Accuracy ±0.001 mm; repeatability ≤0.01 µm; sampling ≥2400 measurements/sec; measuring range covering the full SKU range of the mill; mounting distance 300–1000 mm from the rod; analogue + digital (RS-232 / Ethernet) output to controller; supplied complete with transmitter, receiver, controller/amplifier unit and interconnecting cable.	No.	1
8	Inductive Proximity Sensor — Rod / Piece Counter	Ferrous-metal-only inductive proximity switch, M12 (or M18) barrel, sensing distance 2–4 mm, PNP NO 3-wire, 10–30 V DC, switching frequency ≥1 kHz (response <1 ms per rod), IP67, shielded, LED status indicator, stainless-steel / nickel-brass body, PUR cable or M12 connector pigtail. Immune to heat, smoke, mill scale, steam and dust.	No.	1
9	Sensor Edge Controller / Data Logger Module	Industrial IoT edge controller module (development-grade), 38-pin: dual-core 32-bit MCU @ 240 MHz, 520 KB SRAM, ≥4 MB flash, integrated 2.4 GHz Wi-Fi 802.11 b/g/n + Bluetooth/BLE, ≥30 GPIO, 2× I ² C, 2× SPI, 3× UART, 12-bit ADC, RTC, hardware timers/interrupts for high-speed pulse capture (<1 ms), 3.3 V logic with on-board 5 V regulator, USB programming interface, operating temp –40 to +85 °C. Functions as sensor data acquisition unit and local data logger for the proximity + micrometer pair.	No.	1









A.4 — HIGH-TEMPERATURE PROTECTION & ENCLOSURES

10	High-Temperature Sensor Protective Enclosure (Heat-Proof Box)	Purpose-built heat-proof housing to protect the laser micrometer and the inductive proximity sensor at the hot end of the line. Rated for continuous ambient exposure 300–400 °C. Construction: SS 304 / SS 316 outer shell with ceramic-fibre / calcium-silicate insulation lining and reflective radiant heat shield; internal temperature maintained below 50 °C by vortex-tube air cooling / compressed-air purge; optical-grade quartz or borosilicate viewing window with continuous air-curtain purge to keep the window free of scale and dust; PTFE / high-temperature silicone cable glands; IP66; adjustable stainless mounting flange with heat-break stand-off; supplied with air regulator, filter and pressure gauge.	No.	2
11	High-Temperature Camera Housing with Air Purge — Cooling Bed	Water/air-cooled protective housing for the cooling-bed machine vision camera. SS 304 shell, ceramic insulation, front quartz window with air-curtain purge, internal temperature held below 40 °C, IP66, adjustable pan/tilt mount bracket, high-temperature cable conduit.	No.	1
12	Compressed Air Jet Supply Kit for Enclosure Purge	Air preparation unit for the three purged enclosures: filter-regulator-lubricator assembly, 5 µm + 0.01 µm coalescing filters, moisture separator/dryer, pressure gauges, SS manifold, solenoid, and 12 mm PU / SS air tubing with fittings (≈40 m).	Lot	1
13	Industrial Electrical / Control Cabinet	Floor / wall-mounted IP66 cabinet, ≈800 × 600 × 300 mm, powder-coated CRCA or SS 304, lockable, with mounting plate, DIN rails, cable ducts, thermostat-controlled filter fan set, door-limit light, earthing bar, MCBs, terminal blocks and ferruled internal wiring.	No.	1

A.5 — NETWORK, POWER & PERIPHERALS

14	Industrial PoE Switch	8-port Gigabit managed industrial PoE+ switch (IEEE 802.3af / 802.3at), total PoE budget ≥120 W, plus 2 × Gigabit SFP uplink ports; DIN-rail mount; redundant 12–48 V DC input; operating temperature –40 to +75 °C; IP40 metal housing; supports VLAN, QoS, IGMP snooping, port mirroring, IP whitelisting and industrial protocols (EtherNet/IP, PROFINET); fanless design.	No.	1
15	Structured Cabling & Connectivity — Complete	Cat6 / Cat6a shielded (STP) outdoor-grade armoured LAN cable with UV-resistant jacket (300 m); shielded RJ45 connectors and keystone jacks; 12-port patch panel; GI / PVC conduit and cable trays with supports; high-temperature-rated sensor cabling and signal cable (shielded twisted pair, ≈100 m); power cabling (3-core, ≈150 m); printed (non-handwritten) cable labels following a documented naming scheme; glands, lugs, ties, ferrules and all consumables.	Lot	1
16	Industrial DIN-Rail Power Supply	Regulated industrial SMPS: 24 V DC / 10 A and 12 V DC / 5 A rails, 220 V AC ±20 V, 50 Hz ±2 Hz input; over-voltage, over-current, over-temperature and short-circuit protection; DIN-rail mount; efficiency ≥90 %; LED status.	No.	2
17	Online UPS — Power Backup	3 kVA / 2.7 kW true online double-conversion UPS with capacity to sustain the workstation, switch, cameras and sensors for a minimum of 2 hours; pure sine wave output; SNMP / USB monitoring card; external battery bank sized accordingly.	No.	1

18	Surge Protection & Earthing Kit	Type 2 AC surge protection device, PoE / Ethernet line surge arrestors (per camera run), signal-line surge protection for sensor cabling, dedicated earth pit with copper electrode, earthing strip and continuity bonding, earth resistance <5 Ω .	Lot	1
19	Display, Peripherals & Operator Console	1 × 43" LED display (latest retail model, 4K, HDMI/DP) for the production dashboard; keyboard and mouse set; wall / desk mount brackets; HDMI cabling.	Set	1

Industrial Video-Analytics based Production Counting Solution for Steel melting and Re-Rolling units:

1. Solution Topology and Overview

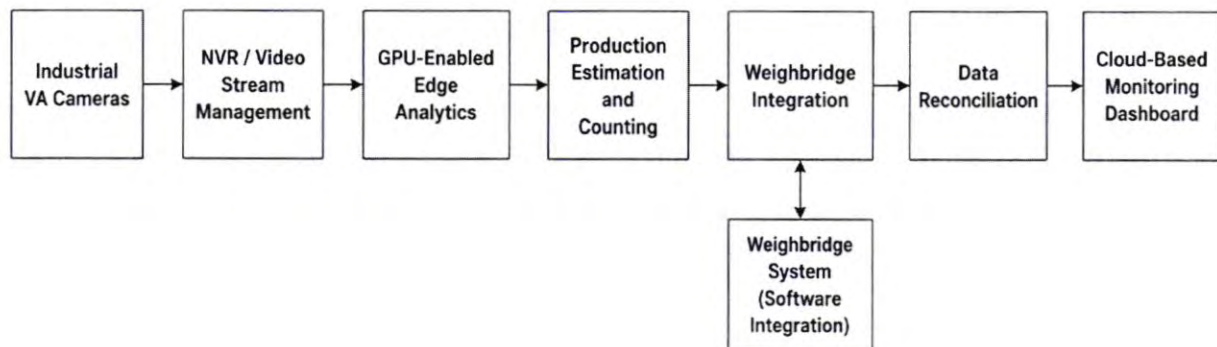
The proposed production monitoring solution is based on an integrated **four-stage monitoring architecture** utilizing Industrial Video Analytics (VA) Cameras and weighbridge integration at critical points of the steel manufacturing and dispatch process.

At the **first stage**, an AI-enabled Video Analytics Camera is deployed at the billet/ingot production point to automatically detect, identify, count and verify billets and/or ingots produced. At the **second stage**, a separate AI-enabled Video Analytics Camera is installed at the relevant die-cast or rolling stage to automatically measure and verify the diameter, dimensions and/or size of the steel product. At the **third stage**, another AI-enabled Video Analytics Camera monitors the cooling bed to automatically count finished steel rods/bars and classify the recorded production according to the relevant product size, diameter or other prescribed parameters.

The live video streams generated at these intervention points are recorded and managed through the **Network Video Recorder (NVR)** and processed through a GPU-enabled edge-computing device deployed within the factory premises. The edge-processing environment applies image-processing and video-analytics algorithms to generate structured production data, including billet/ingot counts, product dimensions and diameter, finished steel rod/bar counts and size-wise production quantities.

At the **fourth stage**, the solution is integrated, through hardware- or software-based connectivity, with the factory weighbridge to automatically capture and verify the actual weight of finished steel products at the time of dispatch. The weighbridge integration records relevant weighment information, including gross weight, tare weight, net product weight, vehicle details and other prescribed dispatch information.

The production and dispatch data generated across all four intervention points is securely transmitted to a **centralized web-based monitoring dashboard**, providing authorized users with real-time visibility of production, product dimensions, finished-product quantities, weighbridge measurements and dispatch activity. The system further performs automated reconciliation of billet/ingot production, product dimensions, finished steel rod/bar counts and final weighbridge measurements to identify abnormal variations, inconsistencies or discrepancies across the production-to-dispatch cycle.



2. Integration/Intervention Points

a) Intervention Point 1: Video Analytics Camera at the Billet Counting Stage

The first Video Analytics Camera has been deployed at the billet production stage. At this point, billets/ingots are produced after scrap is melted in the furnace and cast into semi-finished billets/ingots. The VA camera captures and counts each billet as it exits the billet production process. It also records the visible dimensions, particularly the approximate length and cross-sectional size of the billet (as collected from the factory production team), for further analytical processing.



Billet Produced after Melting Scrap – First Benchmark Point

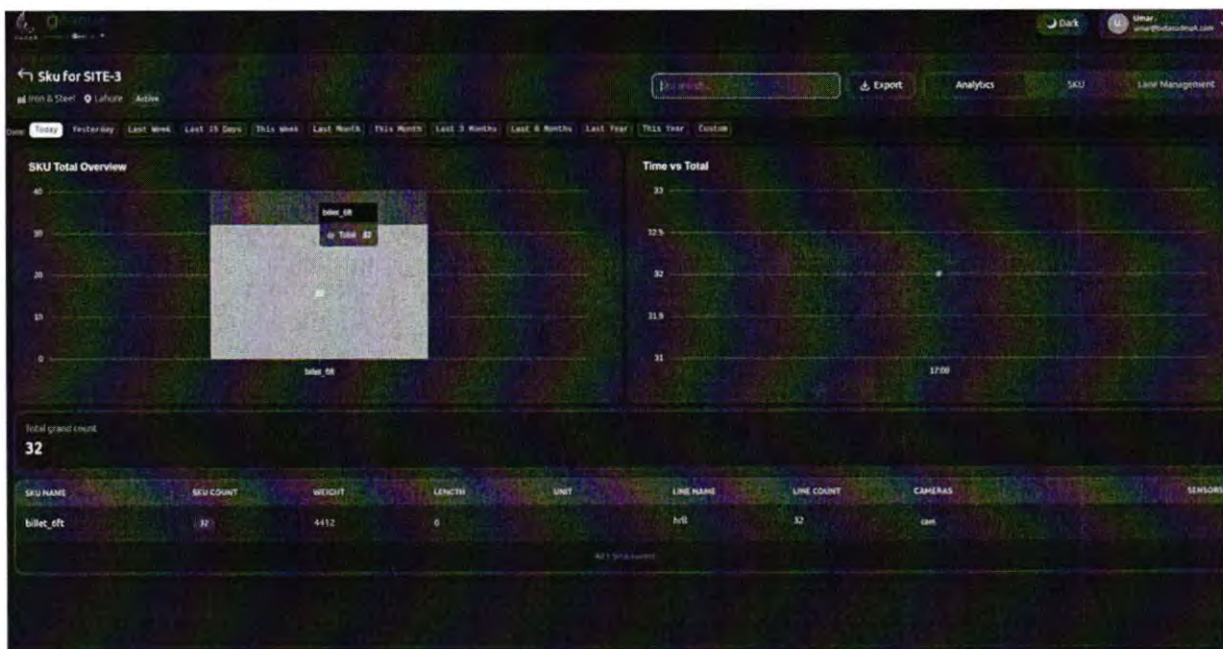
The billets/ingots produced by a steel unit may vary in length, dimensions and approximate weight. These hot billets/ingots are passed through multiple rolling and pressing stages before being converted into a die-cast machine for final shape and a specific size finished steel bar.

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The data captured at this stage is used as the primary production input for estimating the quantity and approximate weight of the finished steel bars that can be produced from the billets. The system records the following information:

- Number of billets/ingots produced
- Approximate length of each billet/ingot
- Visible cross-sectional dimensions
- Estimated weight of the billet/ingot
- Date and time of production

The billet/ingot-stage data provides the initial production benchmark against which subsequent rolling-stage and dispatch-stage information will be reconciled.



b) Intervention Point 2: Video Analytics Camera at the Rolling Die or Groove Setting

The second Video Analytics Camera has been installed at the rolling mill die or groove-setting point. This die-cast machine is manually configured by factory personnel according to the required diameter or size of steel bars to be produced as indicated below:

The camera captures the selected die, groove or machine setting corresponding to the particular diameter of steel rod under production. Through image recognition and analytics, the system identifies the relevant production size and associates it with the billet/ingot data captured at intervention point-1 of the billet/ingot stage capture.

The intervention enables the system to determine:

- The steel bar diameter or size being produced

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- The relevant die or groove selected on the rolling machine
- The time during which a particular size remains under production
- The relationship between pressed billet input and finished rebar (long rod) dimensions.

The die or groove-setting data is combined with the billet/ingot length, dimensions and count captured at Intervention Point 1. This enables the analytics engine to estimate the number and approximate weight of finished steel bars of different diameters that may be produced during a particular production period.



Where multiple steel bar sizes are produced during the same day, the system maintains separate production calculations for each identified size based on the corresponding machine-setting period.

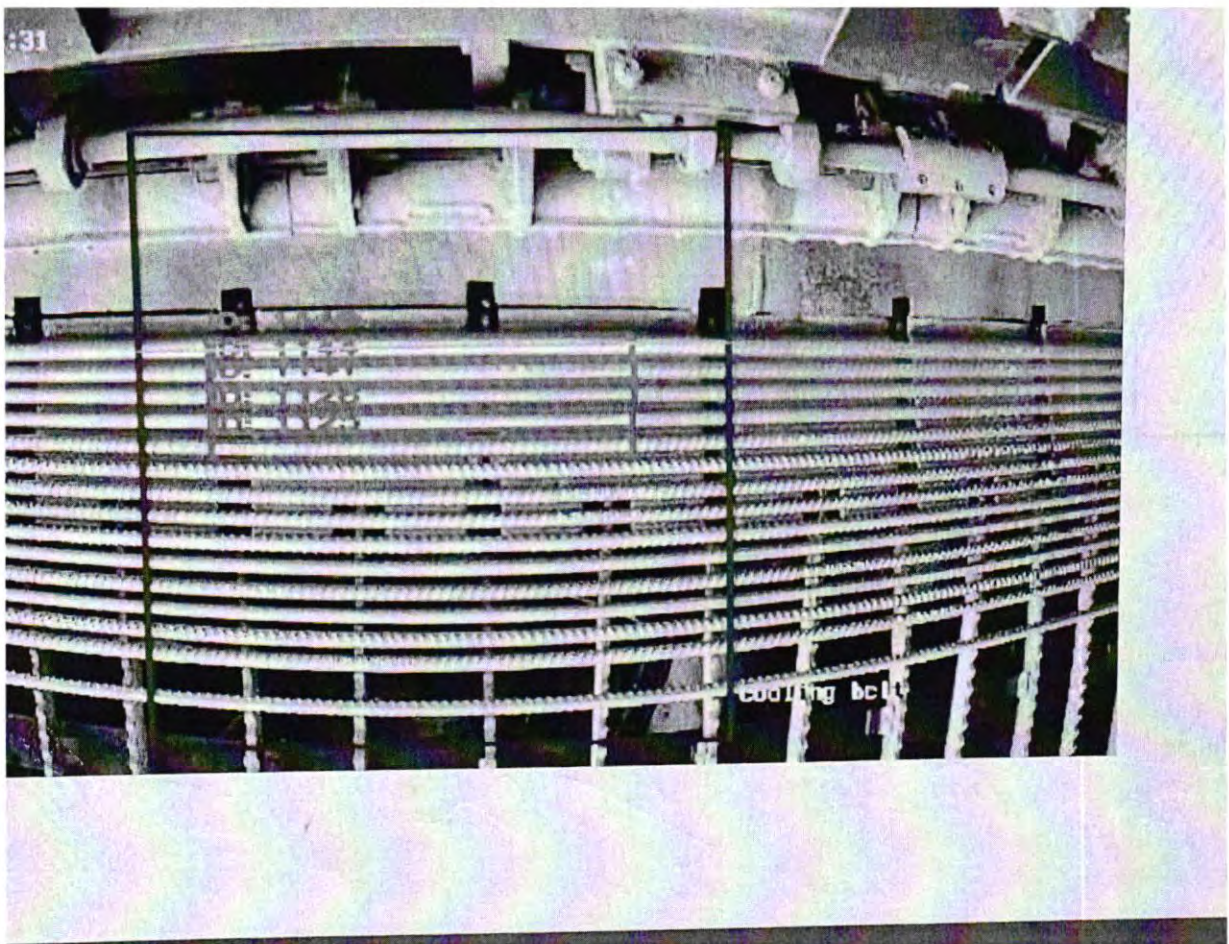
S.No	Billet-Size	Billet Weight	SKU	Length	No of Rods
1	93 Inch	182 Kg	10 mm	122 Feet	7
2	81 Inch	159 Kg	12 mm	122 Feet	4
3	92.5 Inch	181 Kg	16 mm	122 Feet	3
4	87 Inch	171 Kg	19 mm	122 Feet	2
5	96 Inch	189 Kg	20 mm	122 Feet	2
6	75 Inch	148 Kg	25 mm	122 Feet	1
7	124 Inch	242 Kg	32 mm	122 Feet	1

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c) Intervention Point 3: Video Analytics Camera at the Final Cooling Bed

The third Video Analytics Camera has been installed at the cooling bed, where the final rebars are landing for cooling and bundling purposes. This is the stage at which the finished steel bars exit the rolling line, are placed on the cooling bed and are subsequently grouped into bundles for storage or dispatch.

The standard production length of steel bars at the monitored unit is approximately **120 feet**, subject to the actual production configuration and cutting requirements of the factory. The Video Analytics Camera captures the visible length, quantity and movement of finished bars on the cooling bed.



At this intervention point, the system performs the following functions:

- Counts the finished steel bars reaching the cooling bed
- Identifies the diameter or size of the bars captured at intervention point-2 at die-casting machine
- Confirms the standard or configured bar length

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- Records the time and production batch;
- Monitors the formation of bundles;
- Detects abnormal gaps or interruptions in production; and
- Compares the finished-bar output with the billet input recorded at intervention point-1 using the approximation method and fixed rule-based formula for all the SKUs.

The data from the cooling bed acts as a secondary production verification point. It confirms that the billets captured at the first intervention point have been converted into finished steel bars and allows the system to compare the expected output with the actual number of bars reaching the final production stage.

d) Intervention Point 4: Integration with the Weighbridge for Actual Dispatch Weight

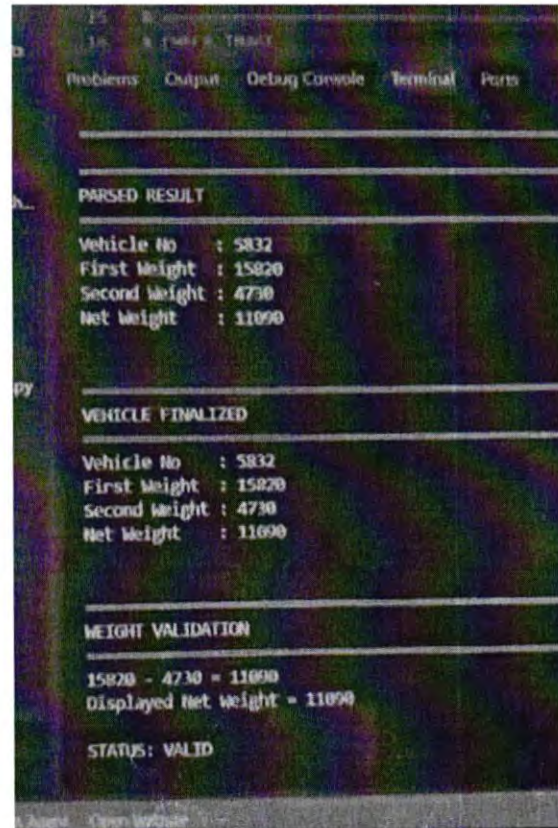
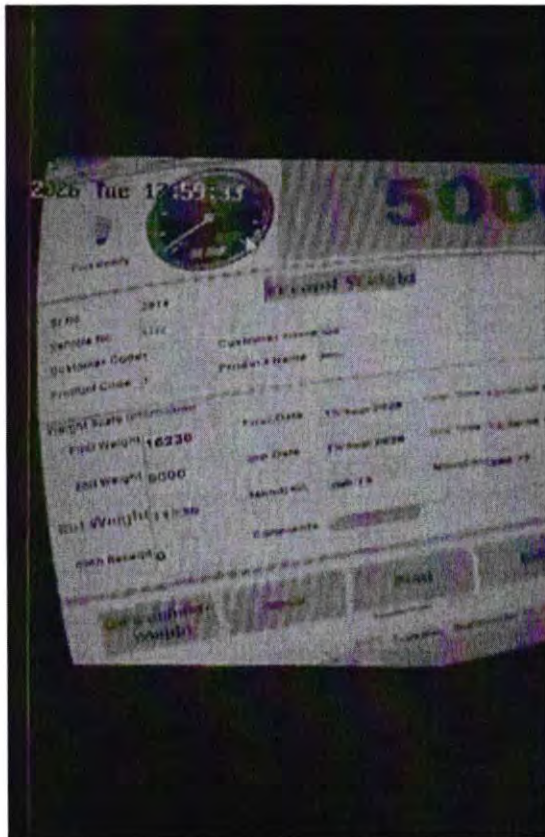
The fourth intervention point consists of integration with the weighbridge installed at the factory exit or dispatch area. The purpose of this intervention is to capture the actual weight of finished steel products leaving the factory premises.

The vendor has implemented soft integration with the weighbridge software being deployed at the factory out-gate. Under this arrangement, the production monitoring solution receives the weighbridge transaction data directly from the weighbridge software.

The integrated system captures:

- Gross vehicle weight
- Tare weight of the vehicle
- Net weight of the steel consignment being shipped from factory
- Date and time of dispatch





The net dispatched weight is calculated as follows:

$$\text{Net Steel Weight} = \text{Gross Loaded Vehicle Weight} - \text{Tare Vehicle Weight}$$

The vendor successfully implemented the software-based weighbridge integration and demonstrated the functionality to the participants of the POC. The actual net weight captured from the weighbridge provides the final and independently verifiable measure of steel rods/rebars dispatched from the factory.

3. Analytical Framework of the Video Analytics Solution Demonstrated during POC

The production monitoring solution captures production data at multiple stages and calculates the weight of long steel bars through a two-stage verification mechanism.

Stage 1: Estimation of Production through Video Analytics

At the first stage, the system calculates the approximate quantity and weight of steel produced through data captured from the production line.

The calculation uses the following inputs:

1. Number and dimensions of billets/ingots captured at intervention point-1

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2. Estimated weight of the billets/ingots (feed into system as per factory SKUs)
3. Die or groove setting captured at intervention point-2
4. Diameter of steel bars captured at intervention point-2
5. Standard or observed length of finished bars at intervention point-3
6. Number of finished bars captured at the cooling bed

The billet/ingot information and selected rod diameter are combined to calculate the approximate production of long steel bars of different sizes using approximation method. Where the diameter and length of a finished steel bar are known, its theoretical weight may be estimated using a standard engineering formula or an approved weight-per-metre table. The calculated weight is then multiplied by the number of bars detected at the cooling bed.

Accordingly, the system calculates estimated production through either of the following methods:

Method A: Billet-Based Estimation

Estimated Finished Production = Total Estimated Billet Weight – Standard Process Loss (1%)

Method B: Finished-Bar-Based Estimation

Estimated Production Weight = Number of Bars × Standard Bar Length × Standard Weight per Unit Length

The estimated production is maintained separately for each identified diameter or product size.

Stage 2: Verification through Actual Weighbridge Weight

At the second stage, the system captures the actual net weight of steel products leaving the factory through direct integration with the weighbridge software.

The weighbridge weight represents the physical quantity of finished steel dispatched from the factory premises. This is also expected to correspond with the quantity recorded in the factory's ERP, stock records, dispatch documentation and tax invoices.

The system compares the production estimated through Video Analytics at Stage 1 with the actual net dispatch weight captured at Stage 2.

The reconciliation may be expressed as:

$$\text{Variance} = \text{Estimated Production Weight} - \text{Actual Dispatched Weight}$$

The variance percentage may be calculated as:

$$\text{Variance Percentage} = (\text{Variance} \div \text{Estimated Production Weight}) \times 100$$

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However, production and dispatch may not always occur on the same day. Finished goods may remain in stock and be dispatched on a subsequent date. Therefore, the system should also account for opening and closing inventory while carrying out production reconciliation.

A more complete reconciliation may be calculated as follows:

$$\text{Expected Closing Stock} = \text{Opening Stock} + \text{Estimated Production} - \text{Actual Dispatches}$$

The expected closing stock may then be compared with the finished-goods inventory recorded in the unit's ERP or stock register.

4. End-to-End Data Reconciliation

The system performs multi-stage reconciliation using the following data sources:

Data Source	Information Captured	Purpose
Billet/ingot-Stage VA Camera	Billet count, length and dimensions	Estimation of raw production input
Die/Groove VA Camera	Diameter or product size	Identification of the steel-bar specification
Cooling-Bed VA Camera	Finished-bar count and length	Verification of final production output
Weighbridge Software	Gross, tare and net dispatch weight	Confirmation of actual quantity leaving the factory

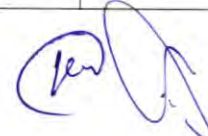
The system cross-checks the quantity estimated at the billet and cooling-bed stages against the actual quantity dispatched through the weighbridge. It can also compare the weighbridge dispatch weight with the quantity recorded in the unit's ERP and reported through the applicable tax-invoicing system.

Stage-II POC Evaluation of Four Stage AI Based Video Analytics Solution

Sr. No.	Criterion	Test Description	Marks Awarded to Vendor
1	Counting Accuracy	The Core Counting Test: The vendor's solution will be compared against the Mill's Weighbridge or Manual Count for a batch of production (100 Billets/ingots or equivalent MTons of Rebars/Sheets/Girders etc). The solution shall demonstrate the different SKUs of Rebars/Billets/Ingots/Sheets/Girders) counting and weight measurement. Scoring:	15

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		• 98% - 100% Accuracy: 15 Marks • 95% - 97.9% Accuracy: 10 Marks • 90% - 94.9% Accuracy: 05 Marks • Below 90%: 0 Marks (Disqualified)	
2	Weighing Accuracy	The Weight Measurement Test: The Vendor's solution shall measure the weight produced by integrating with the factory weighbridge either through soft or hard integration. This captured weight at the weighbridge shall be cross checked and verified with the weight calculated at the initial three stages of AI Vision based cameras integration. The system shall calculate weight based on formula and analytics engine, while the same calculated weight shall be cross verified and check with the final weight at the weighbridge point. Scoring: • 98% - 100% Accuracy: 15 Marks • 95% - 97.9% Accuracy: 10 Marks • 90% - 94.9% Accuracy: 05 Marks • Below 90%: 0 Marks (Disqualified)	15
3	Environmental Endurance (Heat & Dust)	The Stress Test: Hardware (Cameras/Sensors) must be mounted in the actual production zone (e.g., facing the cooling bed or billet ejection path) where temperatures exceed 50°C and metallic dust is heavy. Requirement: The system must operate continuously for at least 48 hours without thermal shutdown, lens fogging, or sensor drift. Scoring: • No hardware failure/restart required: 10 Marks • Required cleaning/intervention > 1 time: 0 Marks	10
4	Object Differentiation (Scrap vs. Product)	The Logic Test: The system must demonstrate the ability to ignore non-production movements. The evaluator will simulate "noise" (e.g., a crane moving an empty ladle, a worker walking by, or scrap movement). The system shall be able to generate alerts in case of abnormal production stoppage or any other related event that can disturb the production count. Scoring: • System correctly ignores all non-product movements: 10 Marks	10





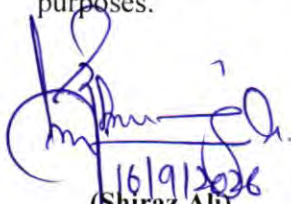
		• System falsely counts scrap/workers as "Production" (False Positives): Deduct 2 marks per error.	
5	Real-Time Data Latency	The Connectivity Test: The evaluator will time the delay between the physical production event (e.g., Billet ejection) and its appearance on the FBR Dashboard. This time delay test shall demonstrate the normal processing time of a final steel bar landing on the cooling bed for bundling from the melting stage. Live reporting of the recorded time and stamp shall follow below test: Scoring: • Data appears within < 60 seconds: 10 Marks • Data appears within 1 - 5 minutes: 5 Marks • Data takes > 5 minutes: 0 Marks	10
6	Tamper & Failure Response	The Security & Resilience Test: The evaluator shall simulate fault and tamper conditions, including: a) Partial or full obstruction of camera/sensor view b) Power interruption or network disconnection Scoring: • System generates an instant "Tamper Alert" or "Offline Alarm" on the dashboard: 10 Marks • System fails silently (no alert generated): 0 Marks	5
		TOTAL MARKS	65

POC Conclusions and Observations:

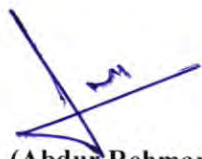
The proposed solution provides a comprehensive four-stage intervention mechanism for monitoring steel production from the initial melting process through final dispatch. Rather than relying on a single camera or production count, the system captures and verifies production at multiple critical points across the manufacturing process. At Stage 1, the solution identifies and counts the billets/ingots produced from the melting of scrap and estimates their corresponding production weight. At Stage 2, the system measures and verifies the diameter/dimensions of the material during the rolling process. At Stage 3, video analytics captures the final count and classification of steel rods/rebars being produced at the cooling bed and calculates the corresponding estimated finished-product weight in metric tons. Finally, at Stage 4, the solution integrates with the weighbridge to capture the actual net weight of the finished steel being dispatched.

The system subsequently reconciles the calculated production weight derived from the first three intervention stages with the actual weight recorded at the weighbridge, thereby establishing an independent cross-verification mechanism between production estimated through video analytics and the quantity physically dispatched. This multi-stage reconciliation enables discrepancies between estimated production and actual dispatch weight to be identified and provides greater assurance regarding the completeness and reliability of production data.

During the Proof of Concept (POC), the vendor successfully demonstrated all four intervention stages, including billet/ingot identification, diameter verification, finished steel bar/rebar counting at the cooling bed, and integration with the weighbridge. The reconciliation of the estimated production with the actual weighbridge data achieved an overall accuracy of approximately 99% during the POC, demonstrating the technical feasibility and effectiveness of the multi-layer verification approach. The direct weighbridge integration further strengthens the credibility of the solution by ensuring that the final reconciled production quantity corresponds with the actual quantity dispatched and recorded in the factory's ERP system for taxation and enforcement purposes.



(Shiraz Ali)
Secretary (VCD)
TDU, FBR (HQ)



(Abdur Rehman)
Second Secretary (VCD)
TDU, FBR (HQ)

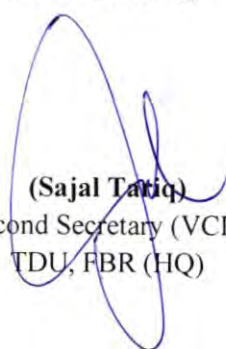


(Ali Saeed)
Second Secretary
(VCD)
TDU, FBR (HQ)

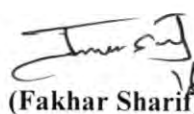


(Kamran Arshad Satti)
Second Secretary (VCD)
TDU, FBR (HQ)

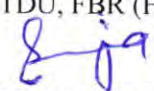
16/09/2026



(Sajal Tariq)
Second Secretary (VCD)
TDU, FBR (HQ)



(Fakhar Sharif)
PRAL Representative



(Muhammad
Saqib Bajwa)
Assistant Director
TTS