GISTC 空间智能 因融至慧 | 2023地理信息软件技术大会
2023 Geospatial Information Software Technology Conference

Harnessing the Power of AI & GIS in Construction Industry

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Outline

- Introduction
- AI in Construction Industry
- Implementation
- Impact
- Verdict

1

Introduction

Company Introduction

Precast & Readymix

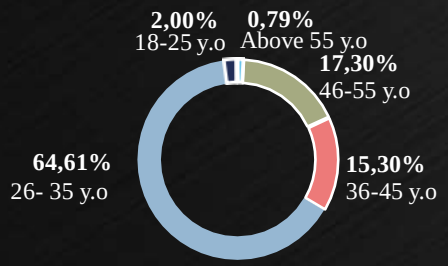
Toll Road

Construction

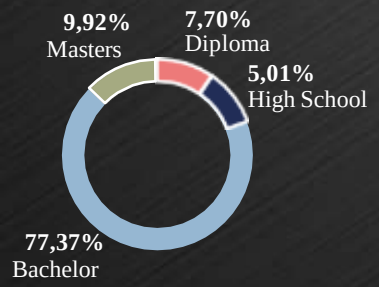
Infrastructure Non-Toll Road

Realty

Waskita Karya Business Lines



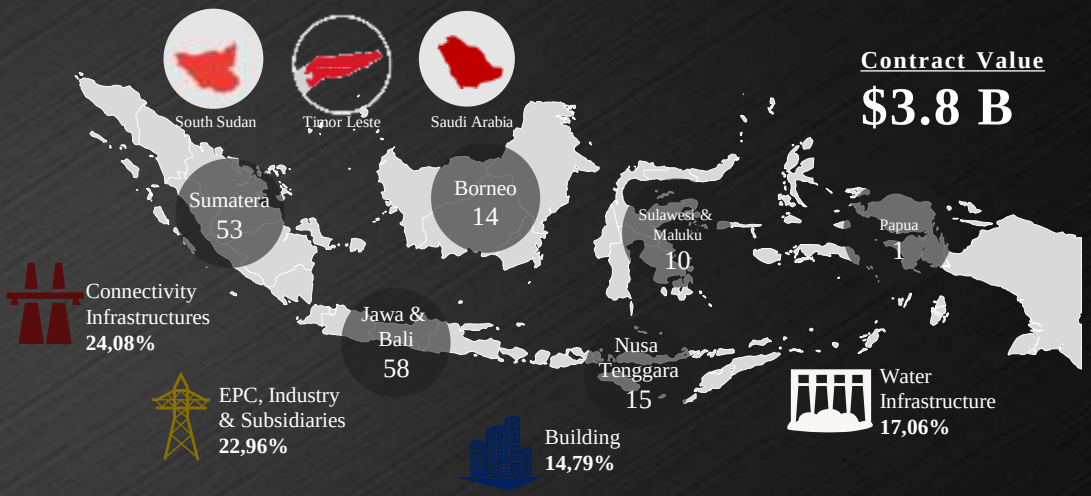
By Age



By Education

Creative And Talented Young People

On-Going Projects & Assets



Contract Value

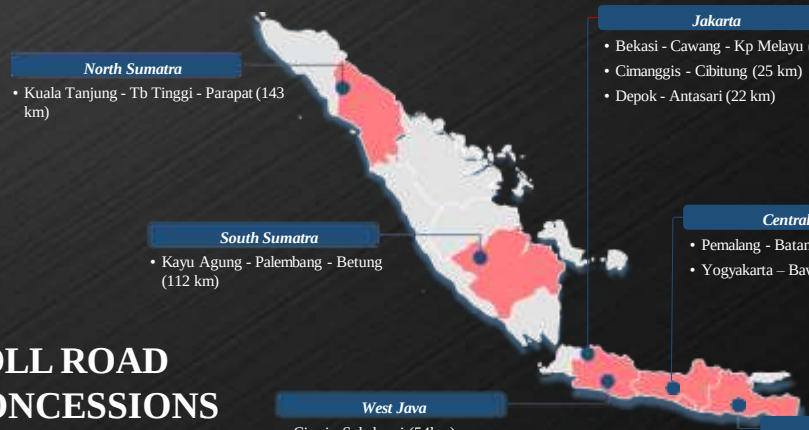
$3.8 B

Connectivity Infrastructures **24,08%**

EPC, Industry & Subsidiaries **22,96%**

Building **14,79%**

Water Infrastructure **17,06%**



North Sumatra
- Kuala Tanjung - Tb Tinggi - Parapat (143 km)

South Sumatra
- Kayu Agung - Palembang - Betung (112 km)

Jakarta
- Bekasi - Cawang - Kp Melayu (16 km)
- Cimanggis - Cibitung (25 km)
- Depok - Antasari (22 km)

Central Java
- Pemalang - Batang (39 km)
- Yogyakarta – Bawen (76 km)

West Java
- Ciawi - Sukabumi (54km)
- Cileunyi - Sumedang - Dawuan (60 km)
- Gedebage - Tasikmalaya - Cilacap (207 km)

East Java
- Pasuruan - Probolinggo (44 km
- Krian - Legundi - Bunder - Manyar (38 km)

TOLL ROAD CONCESSIONS 844 KM

2

AI in Construction Industry

Artificial Intelligence in Construction

Improve Productivity

- ✓ Streamline Business Process
- ✓ Accelerate production
- ✓ Reduce operational cost

Ensure Quality

- ✓ Elevate quality of work
- ✓ Deliver Quality Assurance
- ✓ Reach New Level of Standard

Enhanced Safety

- ✓ Early Warning System
- ✓ Risk mitigation
- ✓ Predictive & Preventive Procedure

Achieve Sustainability

- ✓ Reduce Impact on Environment
- ✓ Smart Asset Management
- ✓ Energy Efficiency

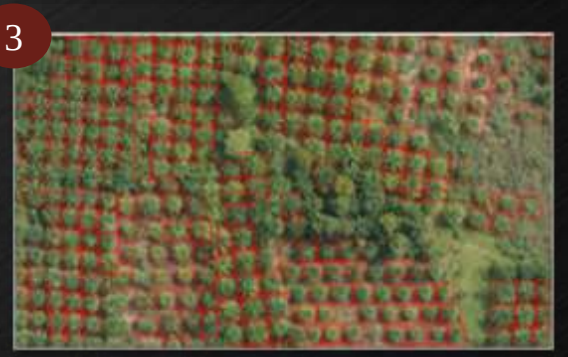
3

Implementation

AI & GIS Implementation in Construction Project

Trees Counting

Margatiga Dam, East Lampung



- > 3000 ha Catchment / Inundation Area
- 7cm GSD of Raster Imagery
- More than 100.000 palm trees detected
- 6 hours processing time
- 92% precision from model evaluation

Drone mapping > Spatial Analysis > Object Detection

AI & GIS Implementation in Construction Project

Pile Counting

Cibitung Cilincing Toll Roads, West Java

- Total length = 34 km
- Total length Slab on Pile Structure = 25,4 km
- Total numbers of Spun Pile > 20,000 units

AI & GIS Implementation in Construction Project

Bolt Detection using Drone

- Drone DJI Matrice M210 + Zenmuse Z30
- 30x Optical zoom

PPE Detection using IP Camera

AI & GIS Implementation in Construction Project

Pavement Crack Detection

Kayu Agung – Palembang – Betung Toll Roads, South Sumatra

Crack Detection

Monitoring Dashboard

Scanning Device

Crack Detection

- Total road length 42 km
- Total Data Acquisition Time = 4 hours
- Vehicle Minimum Speed = 60 km/h
- Total Processing Time = 2 hours
- Total Dataset > 20,000 image

Base Station

4

Impact

Impact

Trees & Pile Counting

Direct Benefits

- Accelerate land acquisition progress
- Lessen the risk of revenue loss due to accuracy

Indirect Benefits

- Reduce risk of safety & security issues
- Evade Social – Economic friction

Impact

89%	90%
Time Efficiency	Cost Efficiency

AI Drone Inspection

Direct Benefits

- Elevate Quality Check to the next level
- Reduce maintenance time and cost
- Provide adequate proof of work to the stake-holders

Indirect Benefits

- Reduce risk of safety & security issues
- Increase stake-holders level of trust

Impact

83%	68%
Time Efficiency	Cost Efficiency

AI Safety Inspection

Direct Benefits

- Improving **safety** & **compliance** (PPE Compliance Check, APK, Defect)
- **Convenience** of remote performance **monitoring**

Indirect Benefits

- **Ensure** on schedule **production** & delivery
- Increase stake-holders level of trust

Impact

24%	20%
Time Efficiency	Cost Efficiency

AI Crack Detection

Direct Benefits

- Improving Road inspection without disturbing traffic
- Organized historical database

Indirect Benefits

- Accelerate the road work/ road repair process
- Centralized information dashboard
- Road inspection can be done more frequent

Impact

WIP	WIP
Time Efficiency	Cost Efficiency

5

Verdict

Verdict

Digital Improvement

- ✓ Internet Of Things (IoT) implementation
- ✓ Improve integration between platform
- ✓ Evaluate impact to business process
- ✓ Scale up implementation for all project

Convince Policy Maker

- ✓ Convince with proof of efficiency by implementing AI in construction
- ✓ Continue to deliver best quality products to stakeholders

Standardization

- ✓ Standardize data quality
- ✓ Create standard procedure for data collection
- ✓ Improve data verification & validation

Improve Knowledge

- ✓ Employee Training Program to elevate knowledge
- ✓ Create Curriculum to standardize knowledge
- ✓ Knowledge management program to preserve knowledge

Thank You All!

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