

December 21, 2017

HITACHI

Reliable solutions

Introduction of "Solution Linkage" making use of ICT and IoT technologies

Kotaro Hirano

Representative Executive Officer,
President, Executive Officer and Director

Hideshi Fukumoto

Vice President and Executive Officer
President, Research & Development Div
President, Client Solution Div

 **Hitachi Construction Machinery Co., Ltd.**

1. “Solution Linkage” in Mid-term Management Plan “ CONNECT TOGETHER 2019”

Kotaro Hirano

Representative Executive Officer,
President, Executive Officer and Director

2. “Solution Linkage” : New value created by HCM

Hideshi Fukumoto

Vice President and Executive Officer
President, Research&Development Div
President, Client Solution Div.

Transform to the corporate structure with high adaptability to changes by improving the profitability and efficiency through value chain enhancement and business structure reform

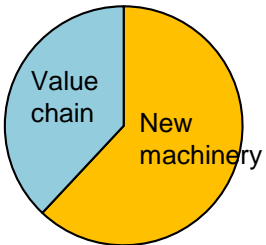
	GT2016 <FY2016>	CT2019 <FY2019>
Adjusted operating income ratio	3.7%	Over 9%
ROE	2.0%	Over 9%
Net D/E ratio	0.46	0.4 or less
Dividend payout policy	31.8%	Approximately 30% or more

< FY2019 preconditions >

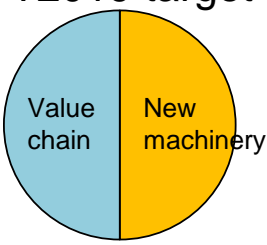
Sales revenue	¥850 billion	Foreign exchange rate	\$1=¥100 / €1=¥110 / RMB1=¥15
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Value chain business ratio

Current



FY2019 target



Other product group

- ✓ Backhoe loader
- ✓ Skid-steer loader
- ✓ Bulldozer
- ✓ Crawler crane

Main products



Marketing

R&D

Production

Procurement

Logistics

New machinery

Finance

Rental

Used machinery

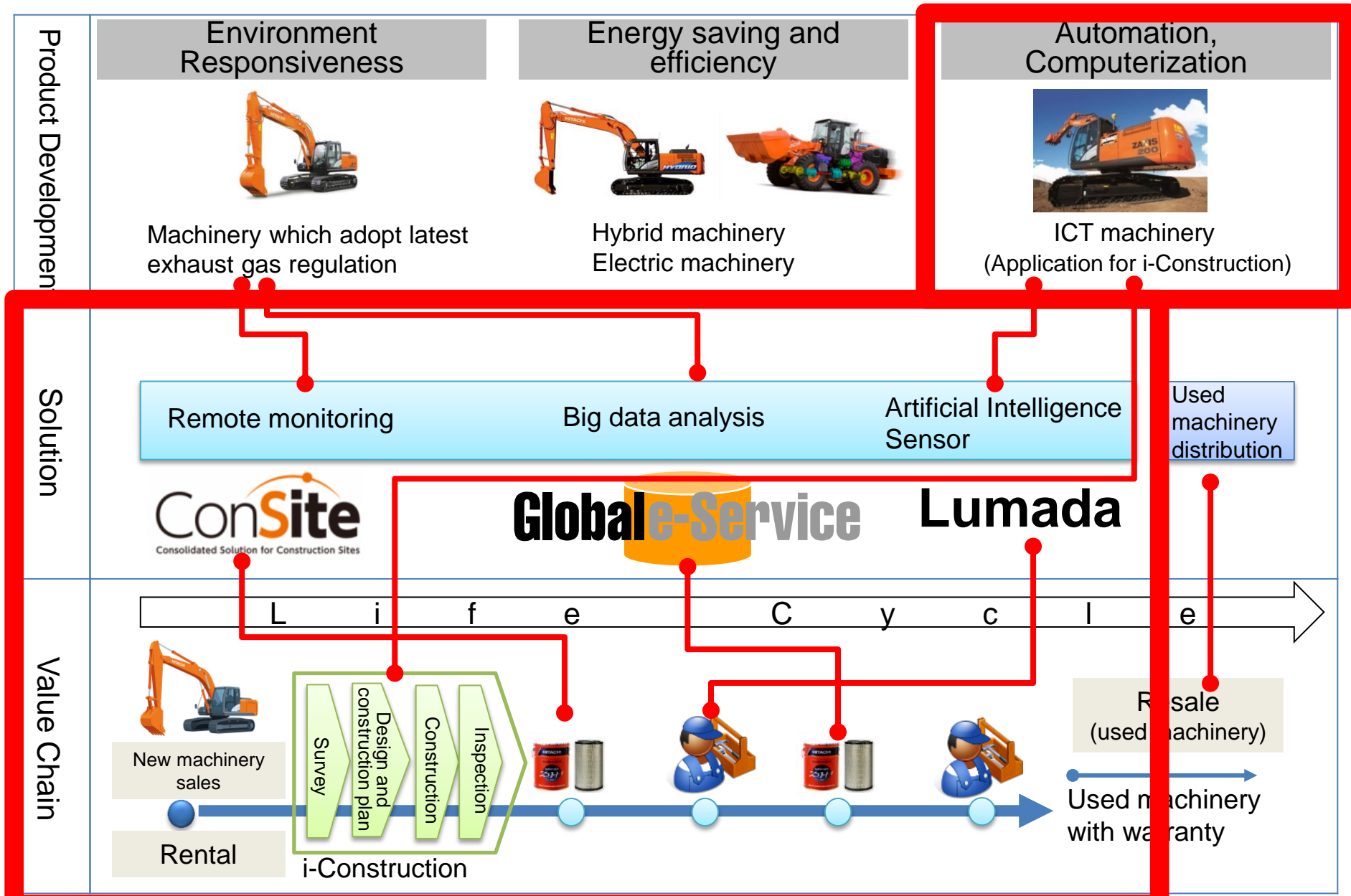
Service

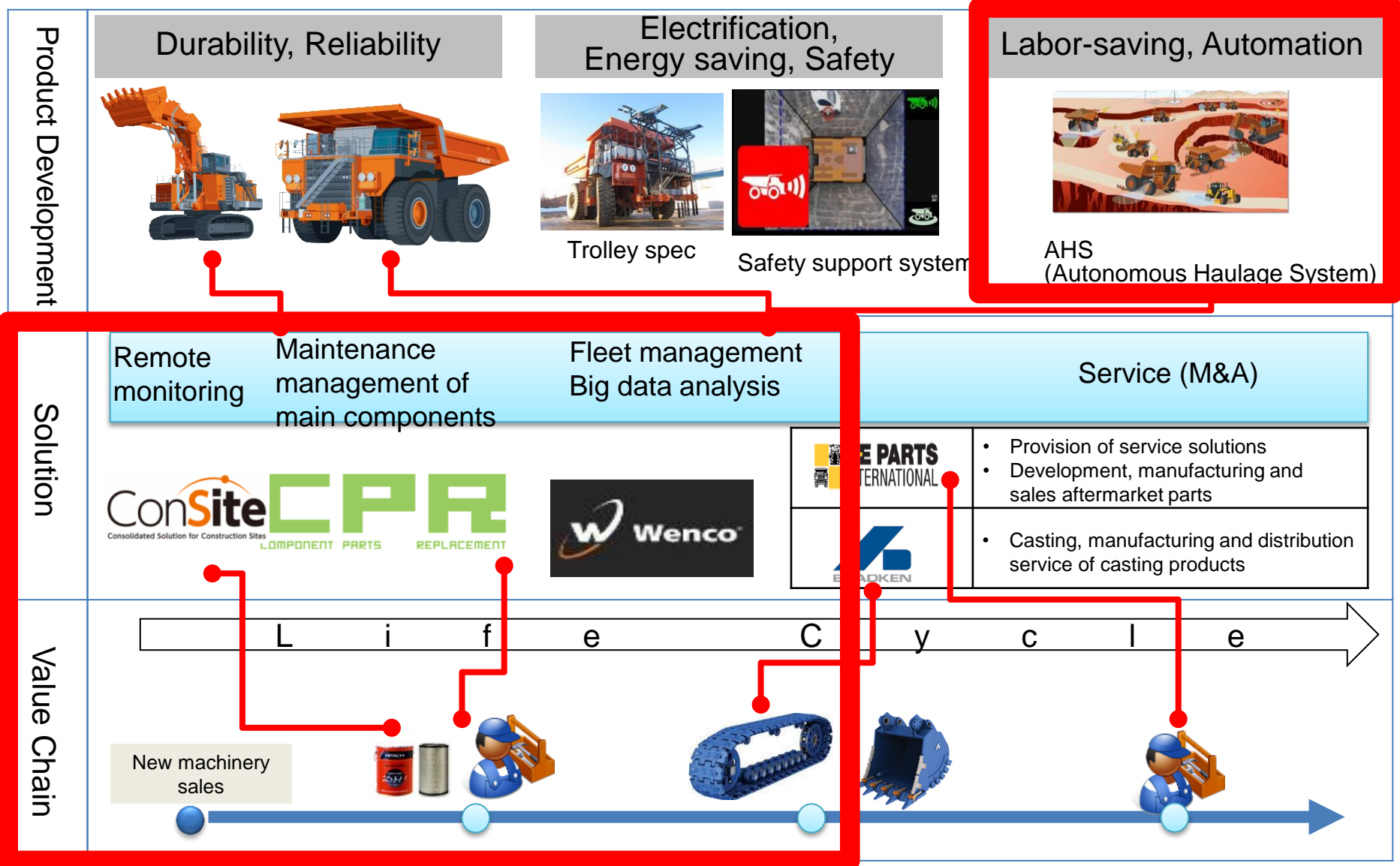
Parts

Parts recycling

Customer interests: Safety and productivity improvement, reduction of life cycle cost

Value chain





1. “Solution Linkage” in Mid-term Management Plan “CONNECT TOGETHER 2019”

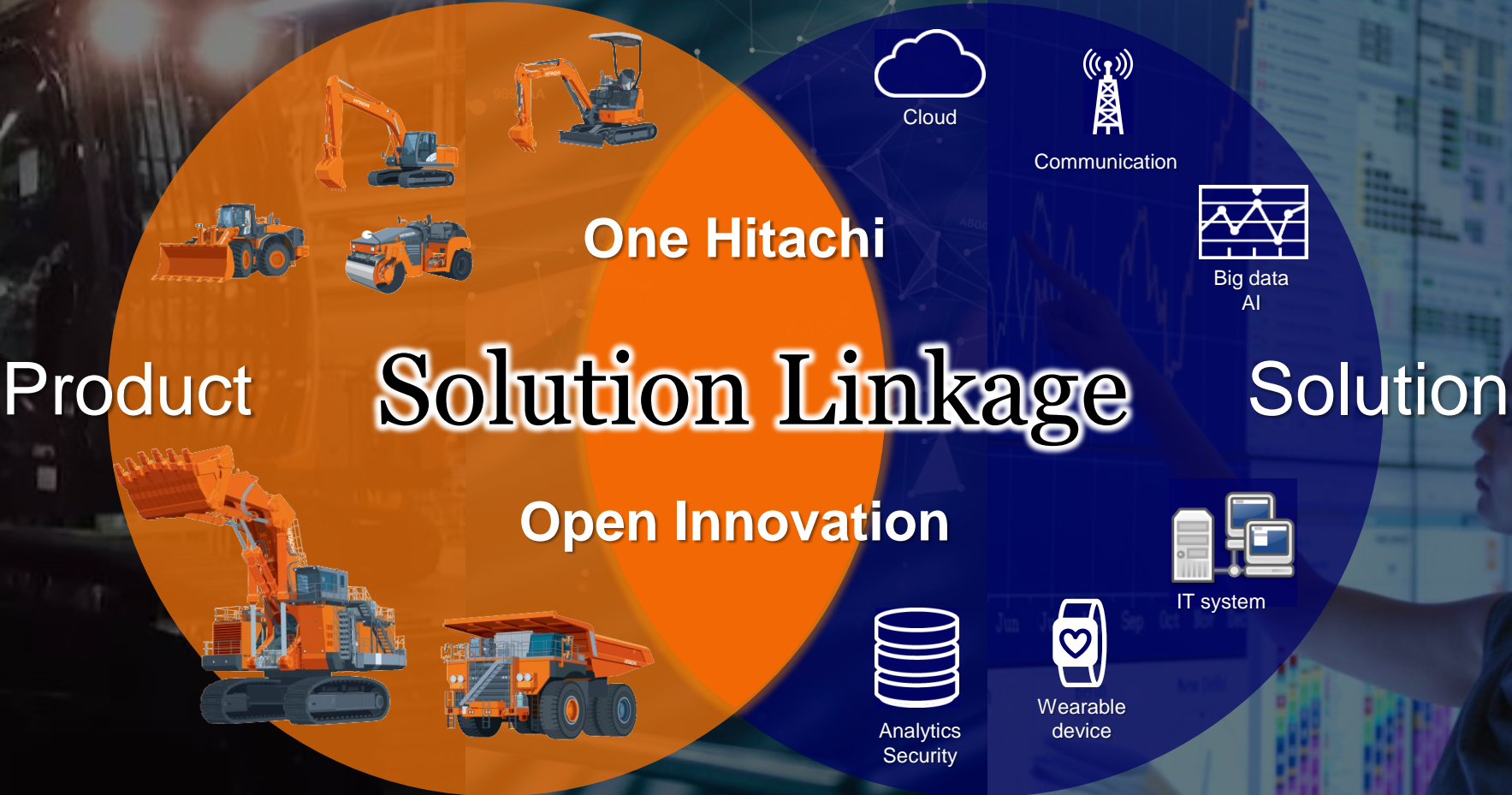
Kotaro Hirano

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Social challenges

Declining birthrate and aging of the population

Lack of workforce, lack of skilled workforce

Deceleration of growth

From expansion of the production volume to improvement of productivity

Sustainable growth

Climate change: emission regulations, CO₂ reduction

The rapid progress of digitalization

IoT+Big Data

All things are connected by data

Fusion of real and cyber worlds

A new paradigm for automatization and labor saving

Rise of venture companies

Collapse of entry barriers and competition rules

Challenges



Methods

【Products】 → 【Products】 + 【Services】

**Creating value for customer using ICT /IoT
is the most important issue**

Customers' needs

Enhancement
of safety

Improvement
of productivity

Reduction of
life-cycle cost

Solution Linkage

ICT/IoT solutions solving problems together with customers

AHSSolutions
[Autonomous Haulage System]



Fleet Management
Solutions



ICT Solutions
for i-Construction



Service
Solutions



One Hitachi

Hitachi Construction
Machinery

Open Innovation

Customers' needs

Enhanced
safety

Productivity
improvement

Reduction of
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Solution Linkage

ICT /IoT solutions solving problems together with customers

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Fleet Management
Solutions



ICT Solutions
for i-Construction



Service
Solutions



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Hitachi Construction
Machinery

Open Innovation

Most important issue: maximizing the management efficiency through innovations

Optimization including electricity, fuel, logistics fields

Improvement of operation efficiency utilizing data from sites around the world

Unmanned and automated excavation, loading, transportation etc.

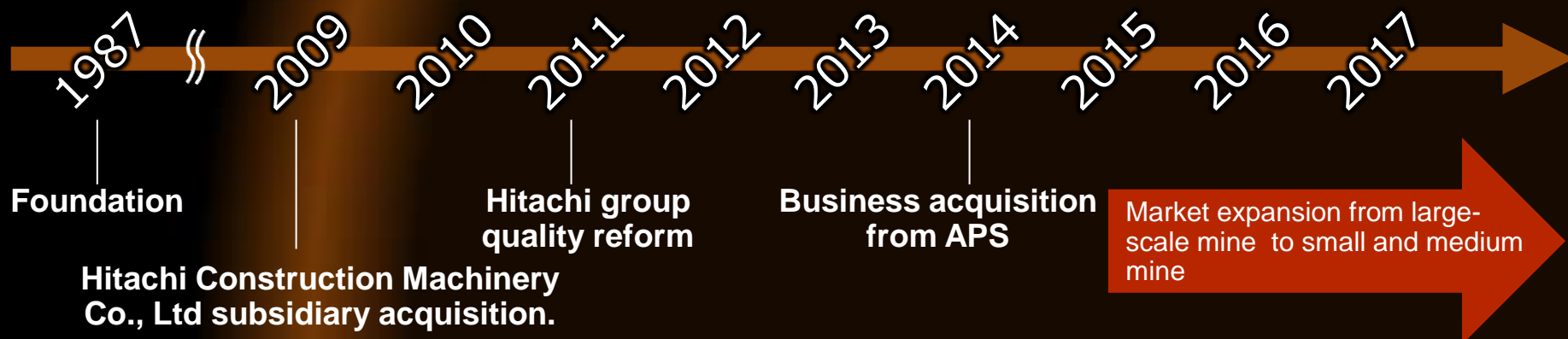




Offering operation management system currently used in 150 mine sites around the world, mainly in open pit mines



- Open platform enabling customers to freely utilize data
- Expansion of functions and business categories due to full utilization of Hitachi's funds, credit and technologies



Basic functions



**Fleet
Management**



**Fleet
Dispatching**



**Machine
Guidance**



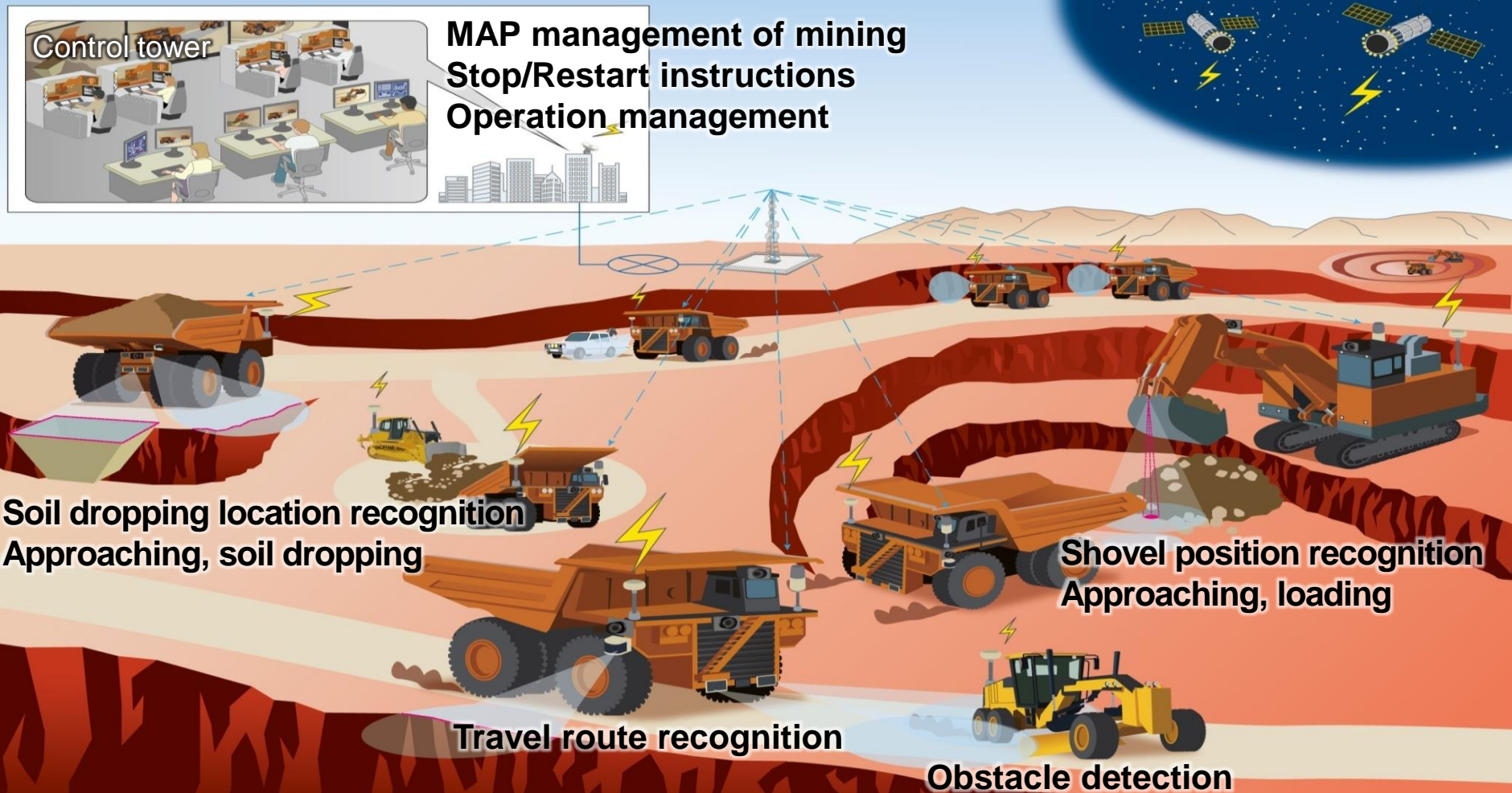
Safety and Navig



**Mine Intelligence
others**



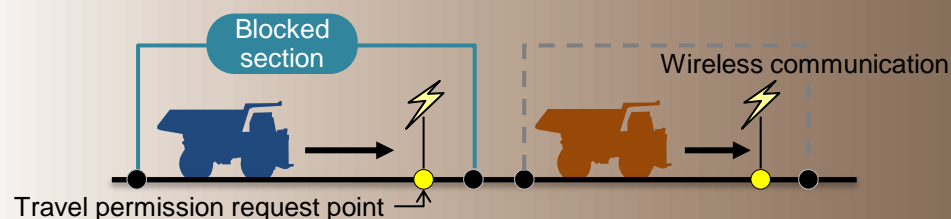
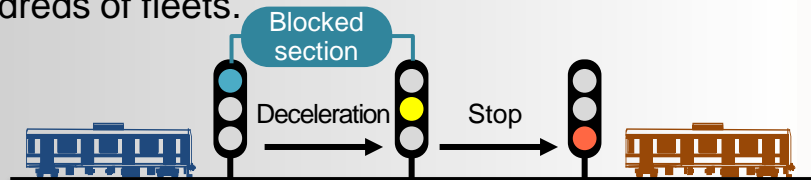
Maintenance



AHS Development Concept

Scalability

Hitachi's railway blockage management system keeps data traffic per unit under control and can handle hundreds of fleets.



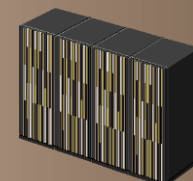
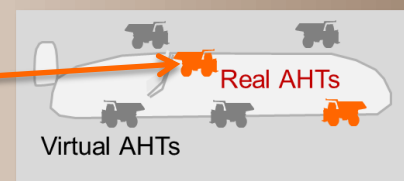
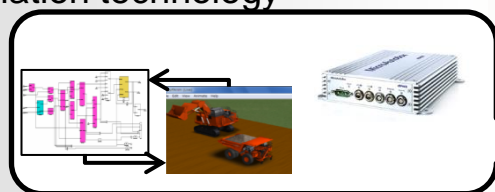
Flexibility

Dump trucks equipped with Hitachi's automobile electric control technology and AC motor control technology can be converted into AHS model after delivery.



Agility

Realized fast system improvement meeting customers' needs due to state-of-the-art model-based development and simulation technology



Further developments

FY2017: Commercialization test in progress

FY2018: User test (planned)

FY2019: Commercialization (planned)



Customers' needs

Enhanced
safety

Productivity
improvement

Reduction of
life-cycle cost

Solution Linkage

ICT /IoT solutions solving problems together with customers

AHSSolutions
[Autonomous Haulage System]



Fleet Management
Solutions



ICT Solutions
for i-Construction



Service
Solutions



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Hitachi Construction
Machinery

Open Innovation

Machine control that can be selected regardless of operator's skills

> Solution Linkage Assist



Each process is seamlessly connected

> Solution Linkage Cloud



Optimization of the relationship between people and work due to mobile solutions

> Solution Linkage Mobile



ZX200X-6 Equipped with Solution Linkage Assist



Offering ICT construction machinery capable of handling both 2D-MC and 3D-MC



The operator recognizes and sets the standards

- 3D design data unnecessary
- Use of fixed ruler



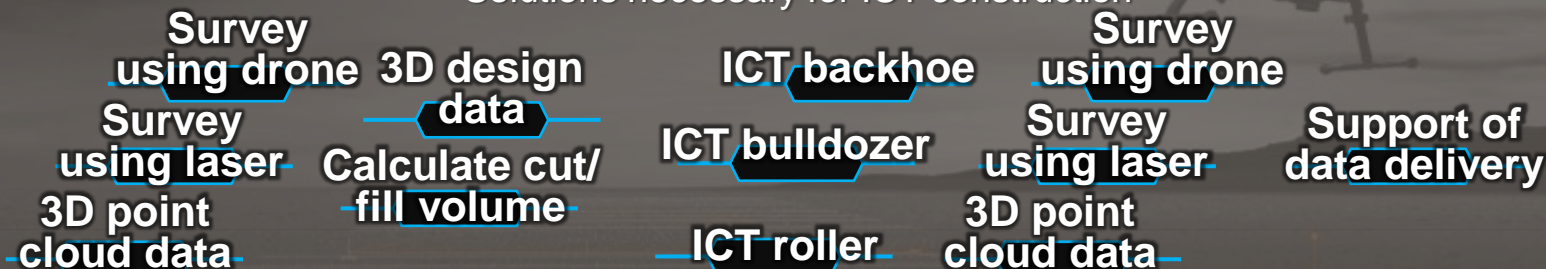
Recognition of excavated surface by position information

- 3D design data required
- Drastic reduction of fixed rulers





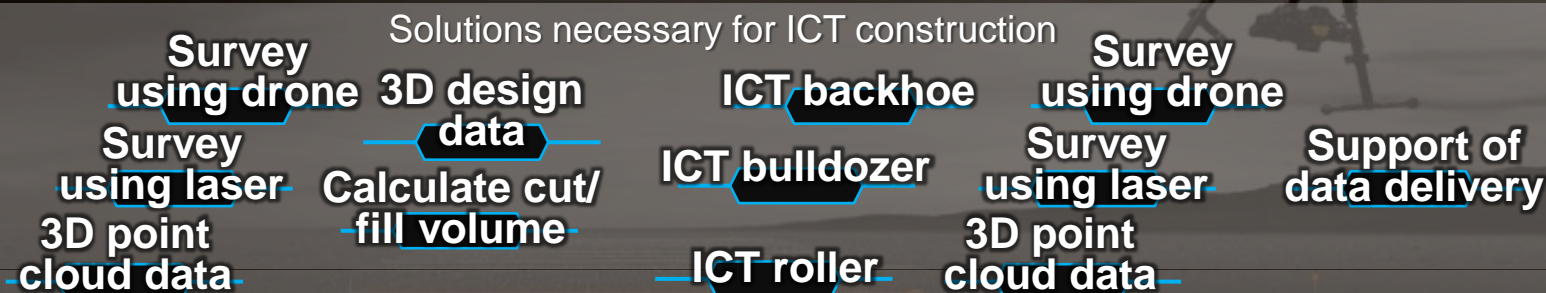
Solutions necessary for ICT construction



Solution Linkage Cloud

Single Sign On

Establishment of a cloud platform enabling open innovations
by seamlessly connecting 3D data of each process



List of our company's open innovations

Survey using UAV/Survey using laser 3D design data

Terra Drone, Kokusai Kogyo, LIKANOS, HIRAI SOKKEN, UNITEC, Kitamura Survey, Geo Research, NT GEOTEC CYUBU, NISOHKEN, COSMO, Jitsuta, Koishi, Geotex chugoku etc.

Sale of construction software

Kensetsu System, FUKUI COMPUTER

Cloud service

Trimble, Hitachi Solutions

Provision of installation service and products

NIKON-TRIMBLE, TOPCON, LEICA

Location information distribution

JENOBA, Nippon GPS Data Service

Inspection and form creation

Kensetsu System, FUKUI COMPUTER, SITECH

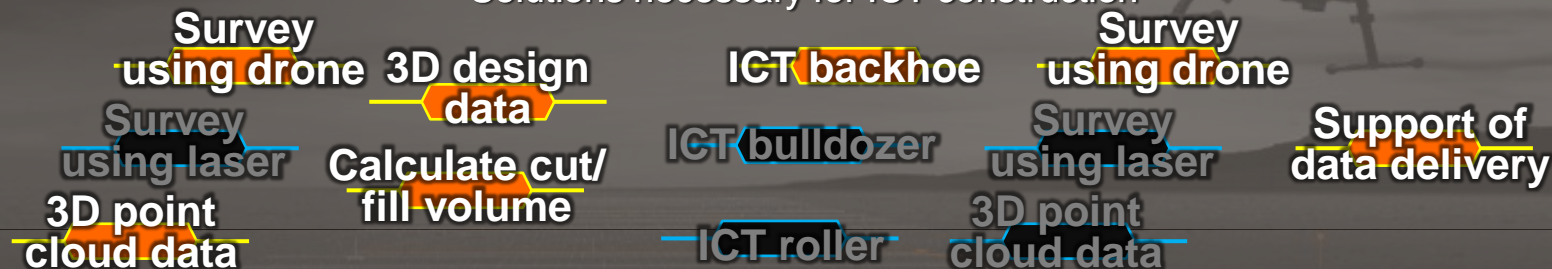
Support center

Hitachi Systems

Customer collaboration case example: Kimura Corporation



Solutions necessary for ICT construction



Kokusai Kogyo Co., Ltd.

Customers' individual thinking

Hitachi Construction Machinery Group

Kokusai Kogyo Co., Ltd.

Customers' individual response

*Partly supported by Hitachi Construction Machinery

Effect

- (1) Customers are accumulating know-how in the company
- (2) Improvement of safety (fixed ruler near machine is unnecessary, etc.)
- (3) Reduced construction period by ~ 2 weeks
- (4) Optimization of on-site management
- (5) Changes in working style due to shortened construction period



Further developments

Digitization of construction machines + Pursuance of solutions for optimization of relationships between people and work

Corresponding to
i-Construction



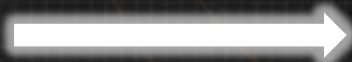
Other industries, overseas
expansion

Solution Linkage Assist



Multifunctionalization including load
measurement, work condition analysis
and safety functions.

Solution Linkage Cloud



Expansion of Solution menu

Solution Linkage Mobile



Expanding the number of sites
introducing technology

Customers' needs

Enhanced
safety

Productivity
improvement

Reduction of
life-cycle cost

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Service
Solutions



One Hitachi

Hitachi Construction
Machinery

Open Innovation

We constantly monitor machines with remotely and support stable operation with our data report service

- **Distribute data report** to 68,000 units worldwide via our **fully automated system**
- Assess malfunction risk from sensing data. **Distribute of alarm report and correspondence manual automatically** in accordance with the seriousness of problem
- **Strengthen efforts for sign diagnostics** and further expand service menus in the future



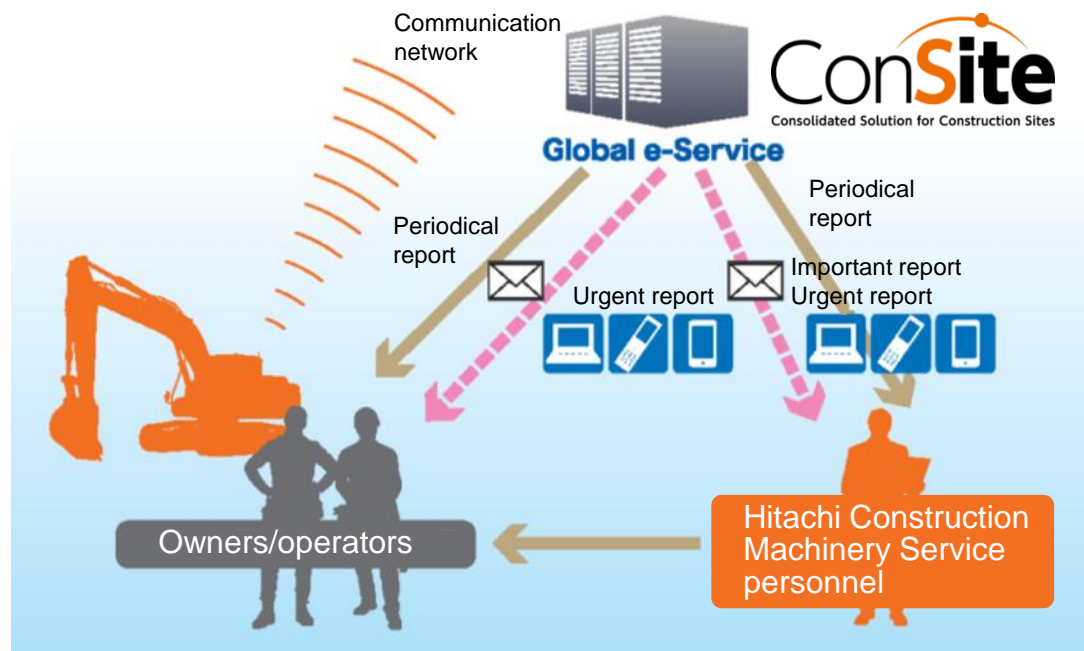
Periodical report
(33 languages)



Corresponding
manual
(16 languages)

**Offered worldwide
Registered number
exceeded 68,000**

* Started service in 2013
As of October 31, 2017



Improvement of remote prognostic detection rate from current 37% to over 90% for 2020

Aiming to achieve a predictability detection rate of 90% or more by utilizing operation data accumulated from approx. 250,000 communication terminal loading machines and introducing IoT technology

■ Remote prognostic detection rate using sensing technology

2020**Target : 90%** or more

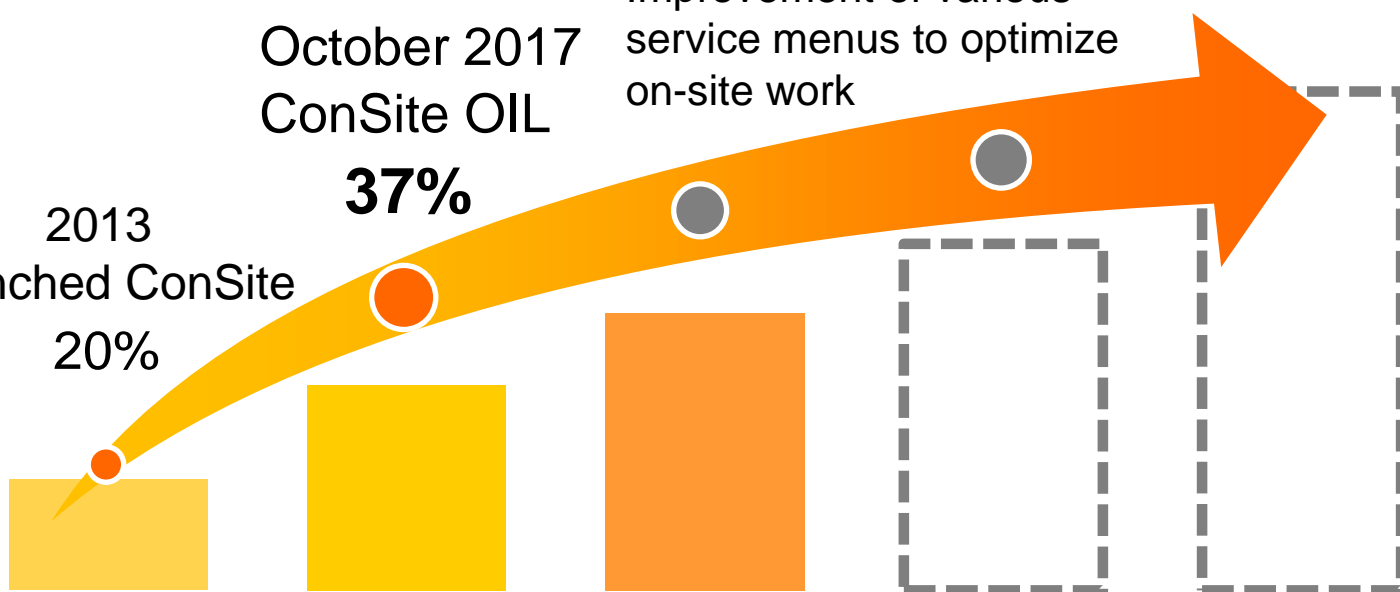
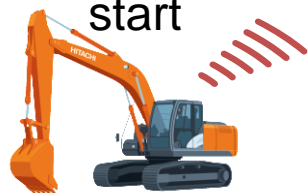
Improvement of various service menus to optimize on-site work

October 2017
ConSite OIL

37%

2013
Launched ConSite
20%

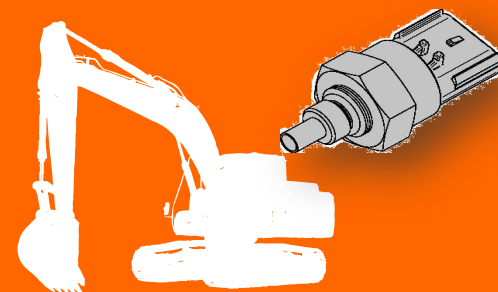
2000
Communication
start



Launched ConSite OIL to improve prognostic detection rate

October 2017

To initiate worldwide promotion of ConSite OIL enabling 24-hour oil monitoring for the first time in the construction machinery industry, we have launched a campaign in Europe and Australia.



【Supplement】 Necessity of preventive maintenance based on oil diagnosis

If you do not perform proper oil management and maintenance...

Because of sudden trouble

**Machine
breakage**

**Due to repair after
trouble occurrence**

**Increase of
running cost**

**Due to response after
trouble occurrence**

**Increase of
repair time**

► Risk avoidance based on oil diagnosis is important

Aiming to differentiate ourselves from other competitors by introducing oil sensors to the industry

■ **Oil sensor:** Detects the state of the oil in each machine by sensor, which could only be judged by color change with the conventional model

■ Two kinds of monitoring oil ■ Monitors deterioration and contamination ■ Monitoring period

Engine oil

Hydraulic oil

Oil degradation: oxidation

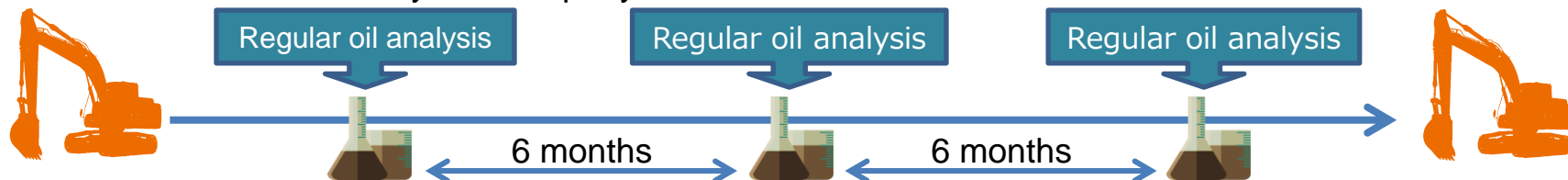
Oil contamination: moisture, soot, fuel mixture

Keep thoroughly watching every day, not regularly, until scrap during operation

<ConSite OIL installation image>

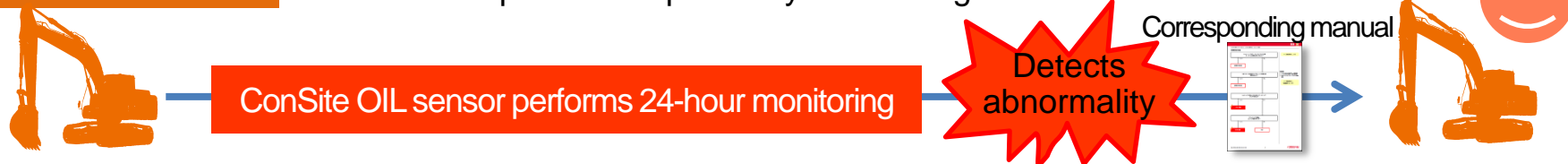
Past

■ Regular oil analysis conducted semi-annually requires labor, time and cost as we need to contract the analytical company.

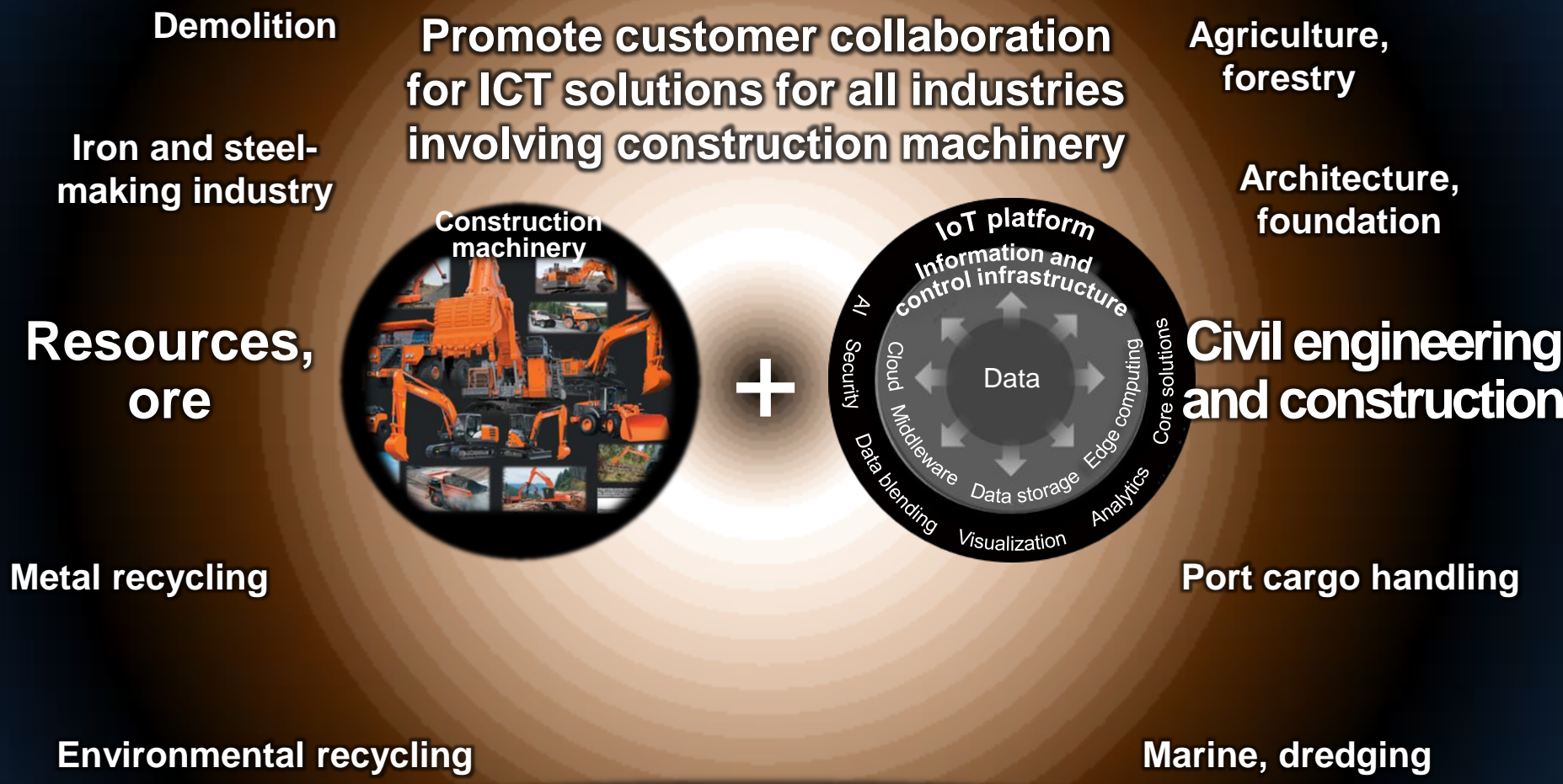


After introduction

- Guarantees safety with 24-hour/365-day watch system!
- Reduces repair costs due to timely response!
- Increases speed of response by use of single sensor!



Improve customer safety and productivity and reduce life-cycle cost



One Hitachi + Open Innovation

【Explanatory note on this document】

This document contains information that corresponds to our company's "statements on the forecast for the future". The future expectations, plans, outlooks, etc. covered in this material are those that the Company has judged to be rational based on currently available information.

The reality may differ greatly from the forecasts, plans and outlooks described in the document due to changes in various factors. Such factors may include changes in economic conditions and demand for products in major markets, fluctuations in exchange rates, changes in domestic and overseas regulations, as well as in standards and practices of accounting.

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END

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 **Hitachi Construction Machinery Co., Ltd.**
Public Relations Strategy office