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SUHALUR INNOVATION



WISEST

4.0 Lean System integrating workers and processes

Workers Integration SystEm in STeal processes

Integrated vision for
workers activity & industrial processes under
the
Lean paradigm
of
accountability and continuous improvement

WISEST

4.0 Lean System integrating workers and processes

Partners

SUHALUR INNOVATION



Universidad Politécnica de Madrid



GESCRAP (Hungary & HQ)



GESTAMP (Louny)



Celsa Steel Services



Lean oriented
Human-machine integration
IoT
Big Data
AI

GESCRAP



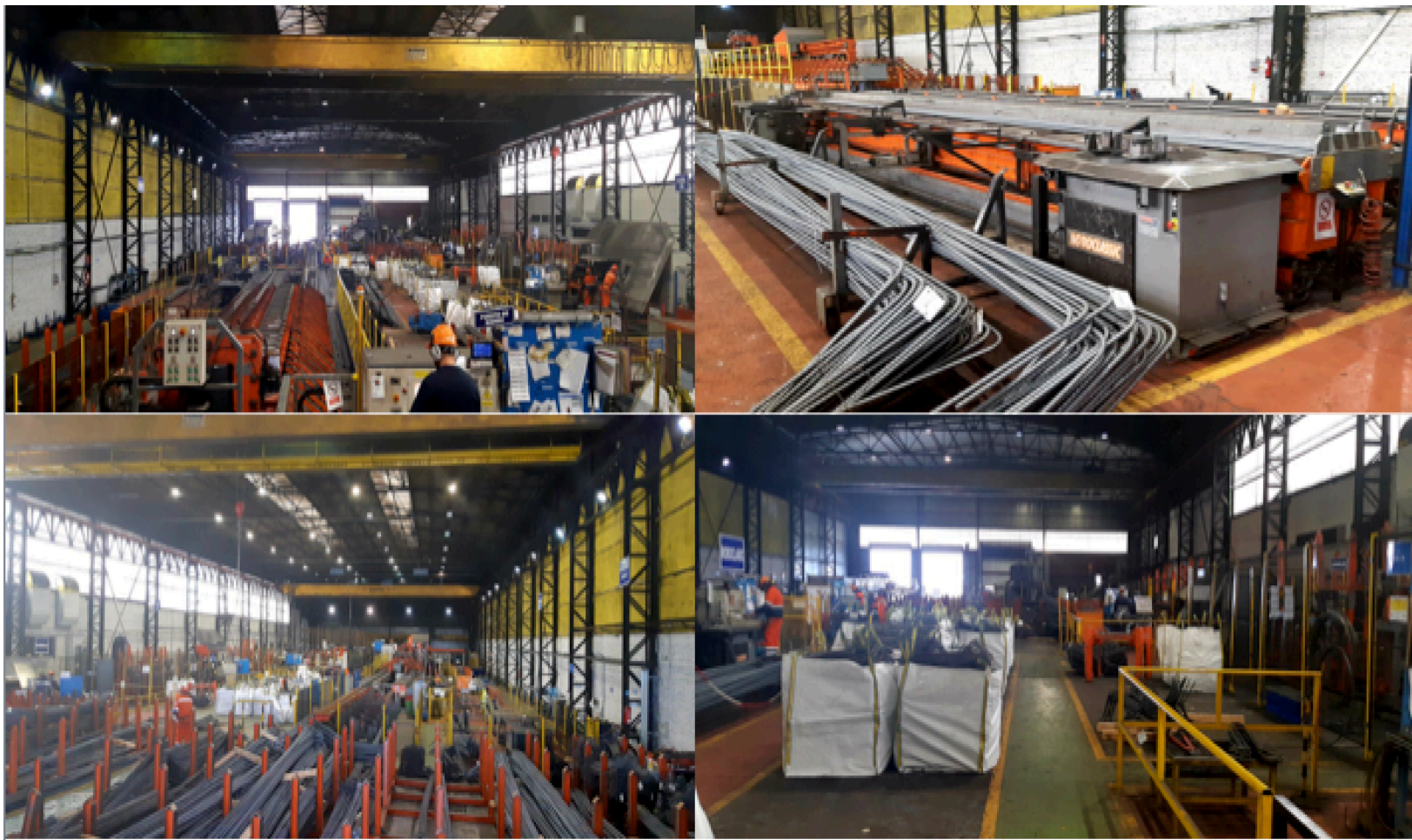
GESTAMP



GESTAMP



CELSA



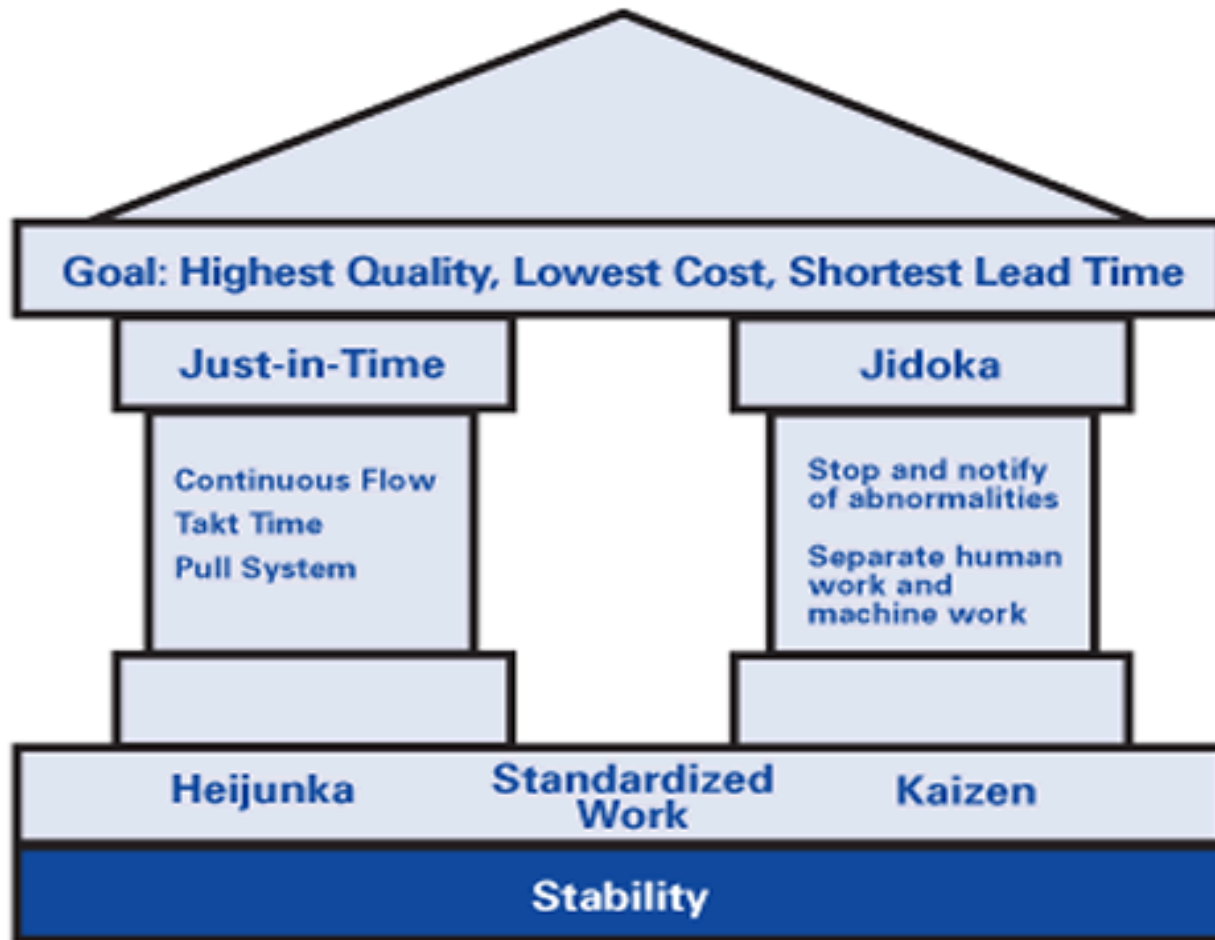
CELSA



WISEST includes workers as an integral part of the process and considers as key parameters not only knowledge and behaviour, but health and safety.

WISEST provides extensive information about the extended production process and identifies *behavioural patterns*. This information will be presented in a way that is actionable and easily convertible to knowledge for the staff and workers.

The Toyota Production System House (TPS)



WASTE REDUCTION



DEFECTS

Waste from a product or service failure to meet customer expectations



OVERPRODUCTION

Waste from making more product than customers demand



WAITING

Waste from time spent waiting for the next process step to occur



UNUSED TALENT

Wastes due to underutilization of people's talents, skills, and knowledge



TRANSPORTATION

Wasted time, resources, and costs when unnecessarily moving products and materials



INVENTORY

Wastes resulting from excess products and materials that aren't processed



MOTION

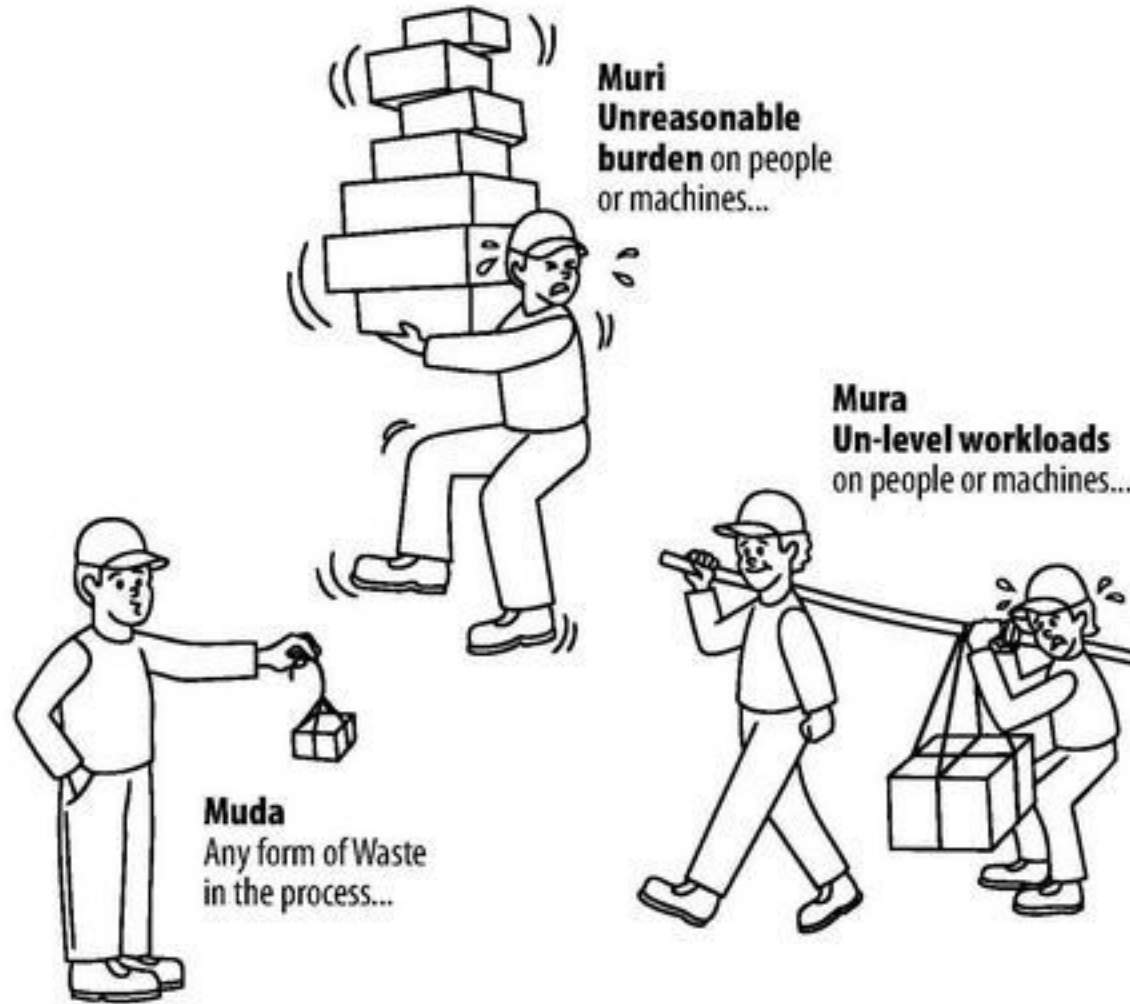
Wasted time and effort related to unnecessary movements by people



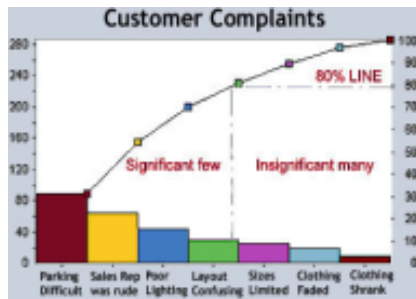
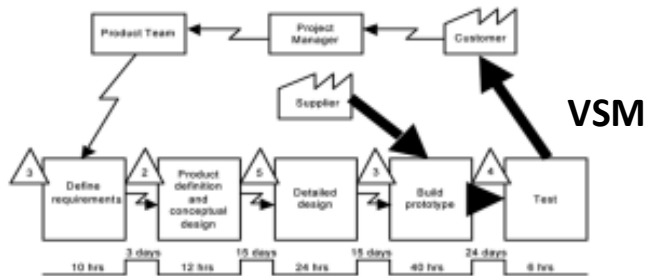
EXTRA-PROCESSING

Wastes related to more work or higher quality than is required

Muda, Mura, & Muri



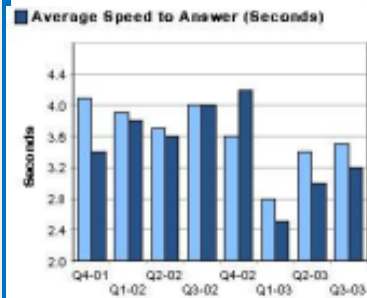
Summarized representation for the adopted (CPD)_nA standard



Plan (P)

[illegible]

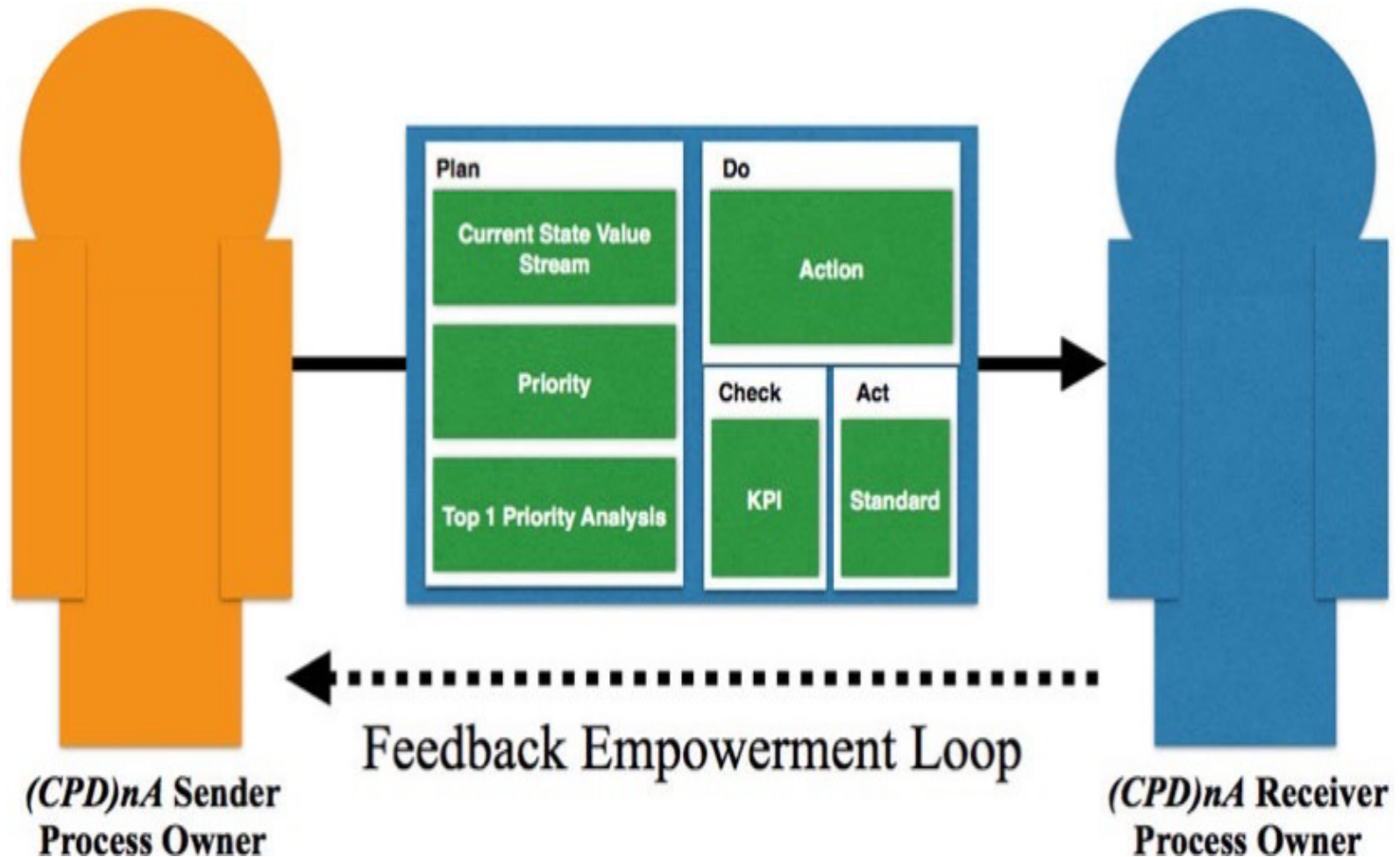
Do (D)



KPI (C)



stANDARD (A)



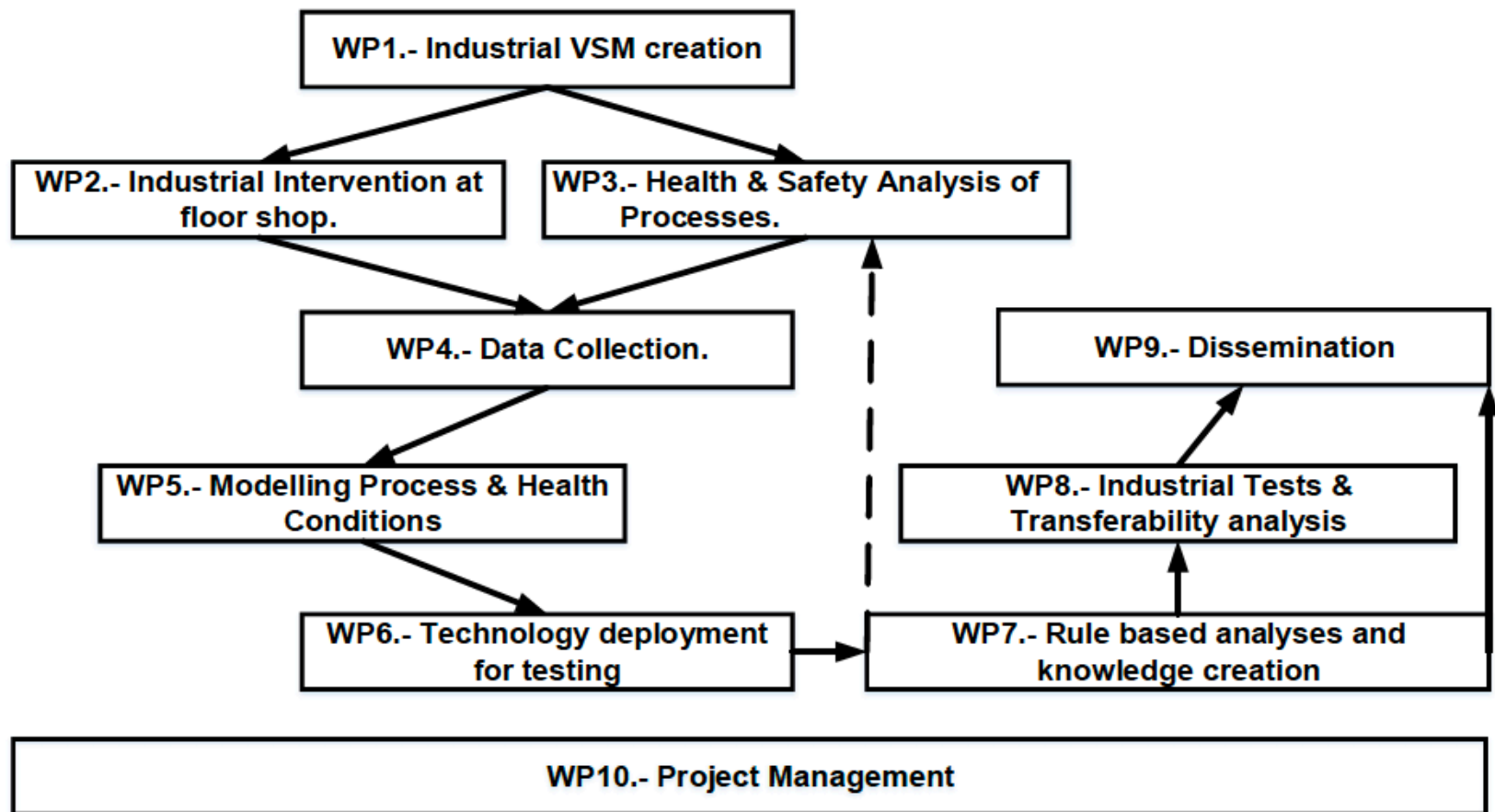
Check or Commitment or Consensus

Plan or Process–Priority–Analysis or Active Learning

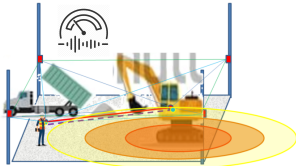
Do or Action

Repeat 1) to 3).

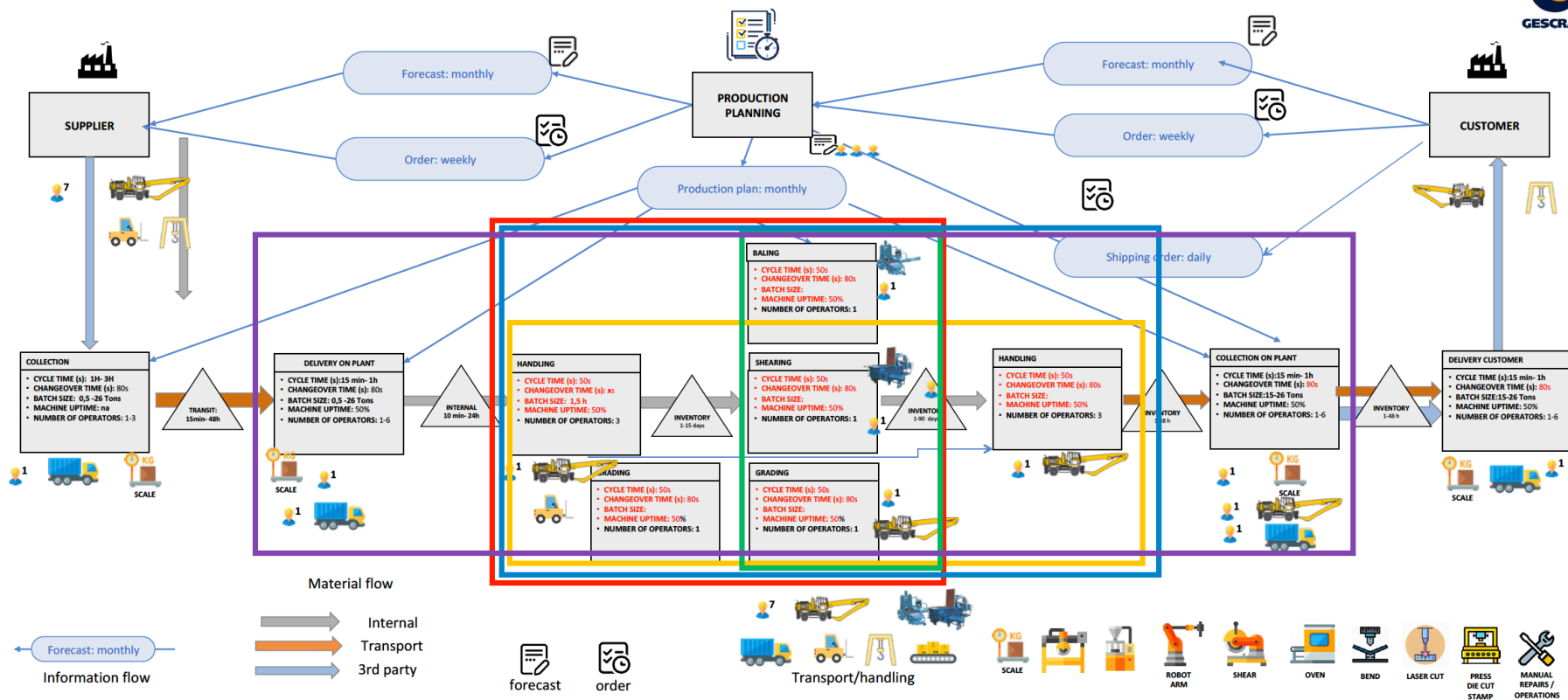
Act or Anchor Active Learning or Standardization

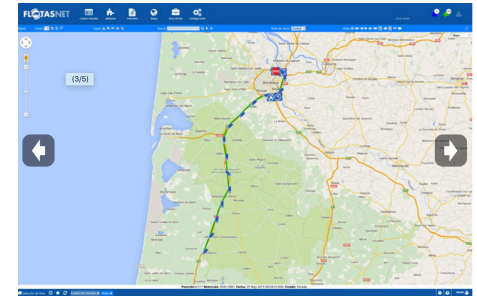
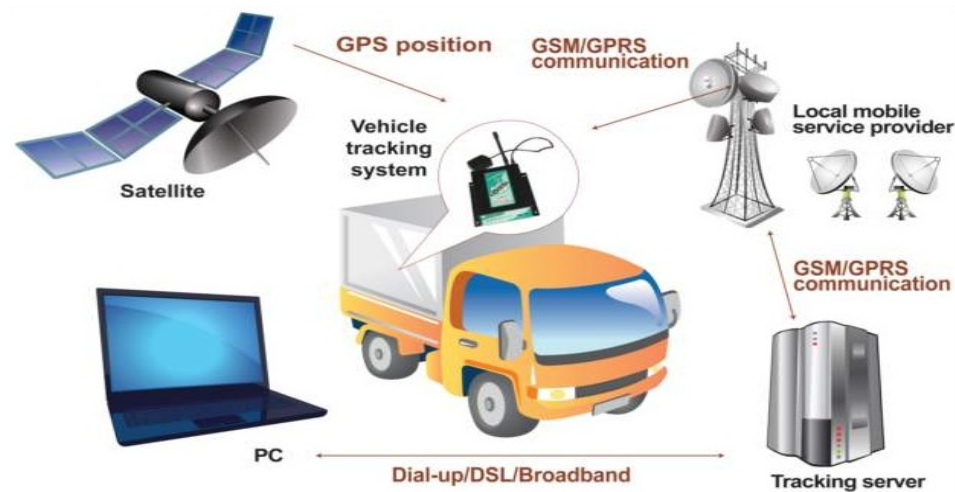


GSC - KPI

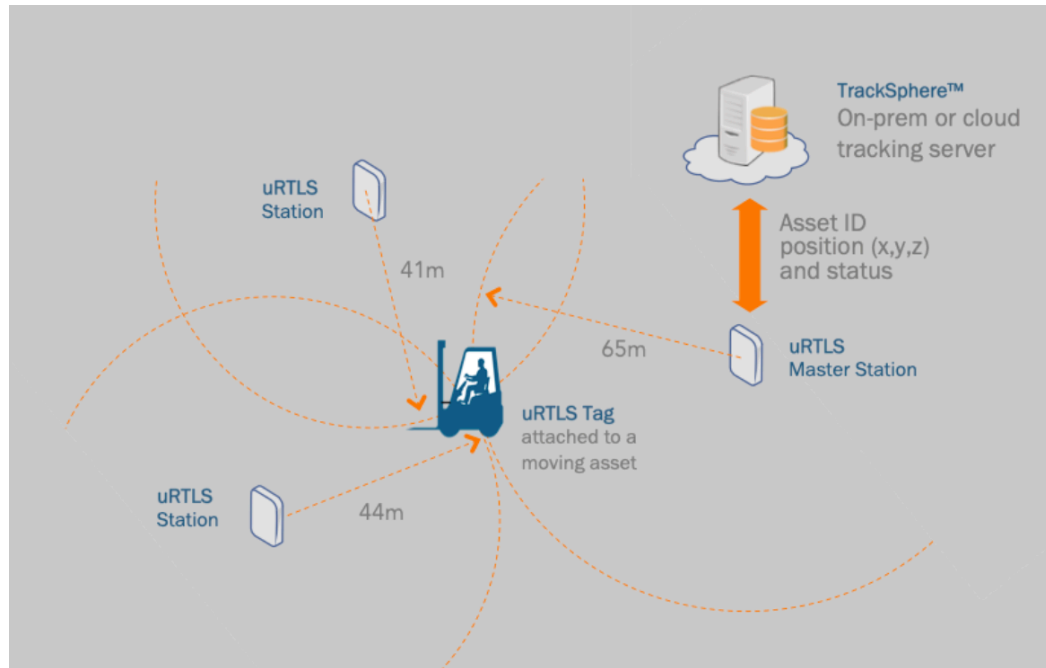
KPI001: Exposition of the operator in an		Monthly
$KPI001 \{T/h\} = \{Monthly\ Production; T\} / \{number\ of\ hours\ per\ month; h\}$		
 <p>representacion grafica maquina fija</p>		
KPI in-process identification The exposure is defined as: - presence of an operator in the loading area - during more than X seconds LEVEL OF EXPOSURE: defined by the following factors FACTOR 1: MACHINE ACTIVITY LEVEL 0= Machine TURNED OFF LEVEL 1= Machine started but not operating LEVEL 2= Machine starts and moving LEVEL 3 = Machine started and with the crane operating FACTOR 2: PROXIMITY VERY HIGH= Distance less than X meters HIGH= Distance less than X to Y meters LOW= Distance higher to Y meters RISK LEVEL DISTRIBUTION FACTOR 1 x FACTOR 2 min = 0 max = 9		
KPI type	Productivity (quantities) [x] Health and safety Efficiency Financial	
Organizational impact level of the KPI	Level 1-2-3	
KPI owner	Plant Responsible	
KPI receiver	Responsible of H&S	
KPI units of measure	Number of events / number of repetitions / time of exposure / level of risk exposure	
KPI last value	53,2	
KPI average value	51,4	
KPI range of typical values	1 situation per load	
Lower limit	0	
Upper limit	24	
Related KPIs (KPIs with shared metrics)	KPI002: Exposition of the operator in an open area with machinery operating KPI003 - KPI004 -	

Position of the employee	
Short definition	position of the employee in the defined area (Y / N)
Update trigger	the operator is within the defined area
Update frequency	0.5seg
Source of the metric	fix positional device / wearable devices.
Alternative sources	cameras to check event accuracy
Observations	BASED ON 3 DIFFERENT LEVELS : SEE METRICS
Position of the Machine	
Short definition	Position of the machine in the defined area (Y / N)
Update trigger	the machine is within the defined area
Update frequency	0.5seg
Source of the metric	fix positional device / position device in machine
Alternative sources	cameras to check event accuracy
Observations	BASED ON 3 DIFFERENT LEVELS : SEE METRICS
Operating situation of the machine	
Short definition	Definition of the machine operation
Update trigger	the machine changes their operation
Update frequency	0.5 seg
Source of the metric	device to measure machine operation
Alternative sources	potential machine status:
Observations	turned off started on movement crane in operation crane steering
TIME ON RISK	
Short definition	Time exposed to risk higher than 1
Update trigger	there is a risk situation over 1 value for more than 1 seg
Update frequency	1 seg
Source of the metric	combination of factors = risk level + timer (synchronised measures)
Alternative sources	
Observations	all measures should be time synchronised to define this factor
LEVEL OF NOISE	
Short definition	Level of noise that the staff is exposed to
Update trigger	
Update frequency	continuous
Source of the metric	Db meter
Alternative sources	
Observations	all measures should be time synchronised to define this factor





The data are accessed via a web-service for the tracking of trucks, connecting the on board technology, from a middleware having the proper certificates to have the right to consume such data every single minute for a set of trucks.



Tags for Assets

- uRTLS™ asset tracking tag featuring:
- Industrial level IP67 enclosure with attachment holes.
 - Accelerometer with Tracktlo firmware to enable smart energy management and modes of operation.
 - Dimensions 9 x 6 x 2.4-3.5 cm (depending on models).
 - Powered by standard rechargeable battery and USB charging adapter.
 - SOS button.
 - Status indication LEDs.
 - Customization options.



Tags for People

- uRTLS™ worker tracking tag featuring:
- Badge shape with industrial level enclosure.
 - Man-down feature.
 - Tracktlo firmware for smart energy management and worker modes.
 - Slim device: 9 x 6 x 1.1 cm.
 - Powered by standard rechargeable battery and USB charging adapter.
 - Status indication LEDs.
 - Optional customization options.



uRTLS™ Stations

- uRTLS™ Stations are industrial level RTLS anchors featuring:
- 802.15.4-2011 UWB transceiver and antenna for up to 100m coverage.
 - Plug-and-Play capabilities. Remote management and configuration.
 - Various electrical supply options: AC 110-220V, PoE or 5v USB charger.
 - Backhaul connectivity over Ethernet or wireless, over UWB (not Wi-Fi).
 - Status indication LEDs.
 - Dimension 20 x 10 x 6 cm.
 - Industrial-grade enclosure and components.
 - Protection IP67.

- Attach tags to the asset or person of interest.
- Deploy stations to cover the area.
- Using UWB, extremely short signals are exchanged back and forth between the stations and the tags. The tag location can then be calculated using different delays of signal responses.

Example of gadget under development
Arm-shoulder relative position detection

