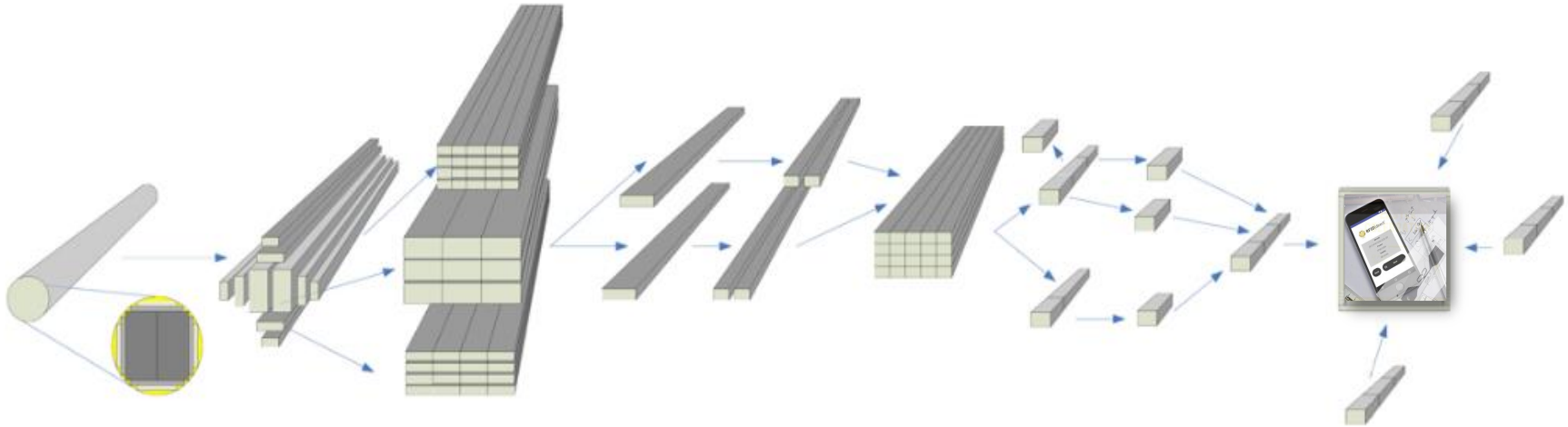
RFIDdirect Ltd & GmbH

Measuring Performance



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Measuring Performance Manufacturing

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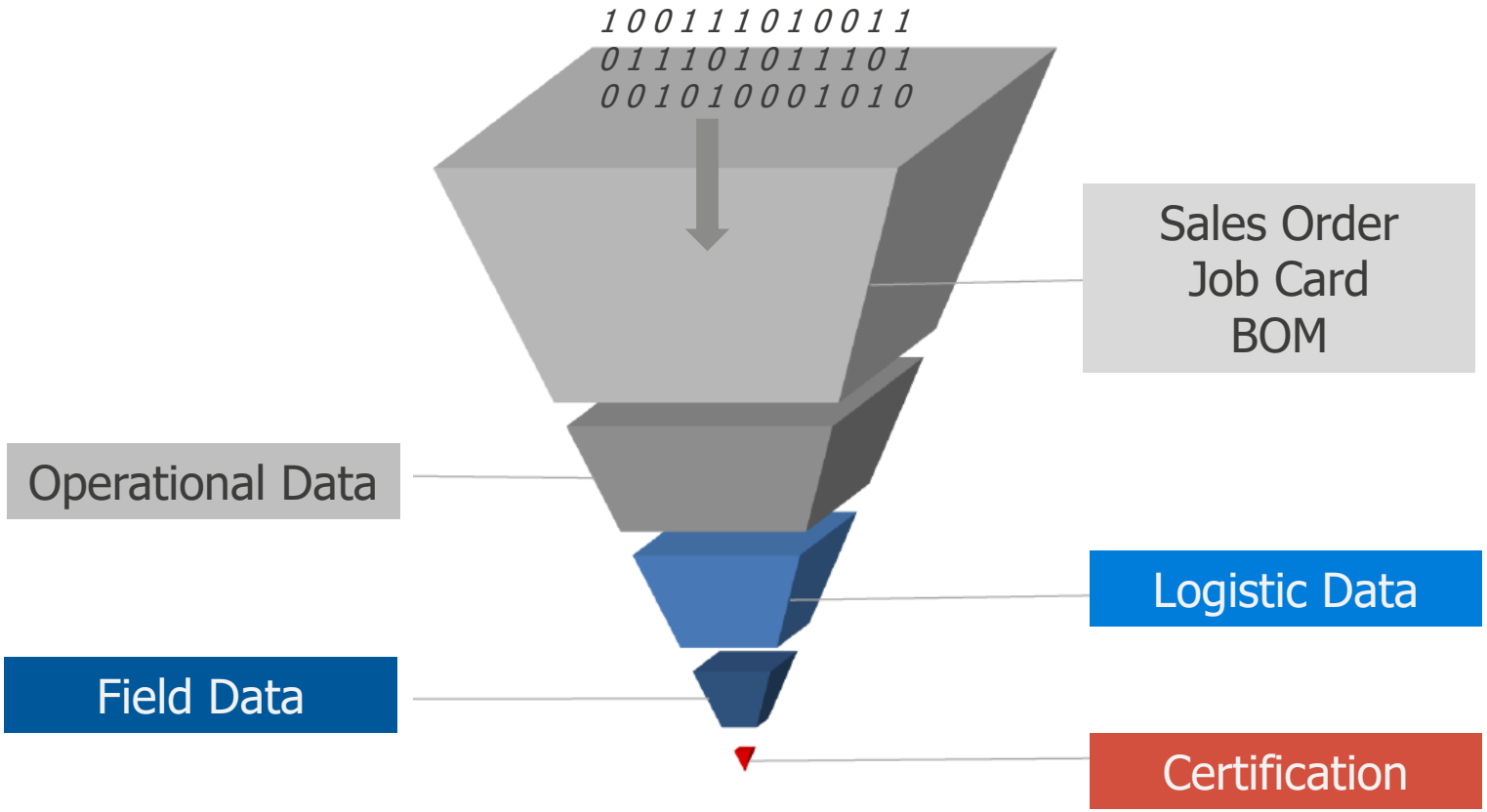
Production Data Funnel



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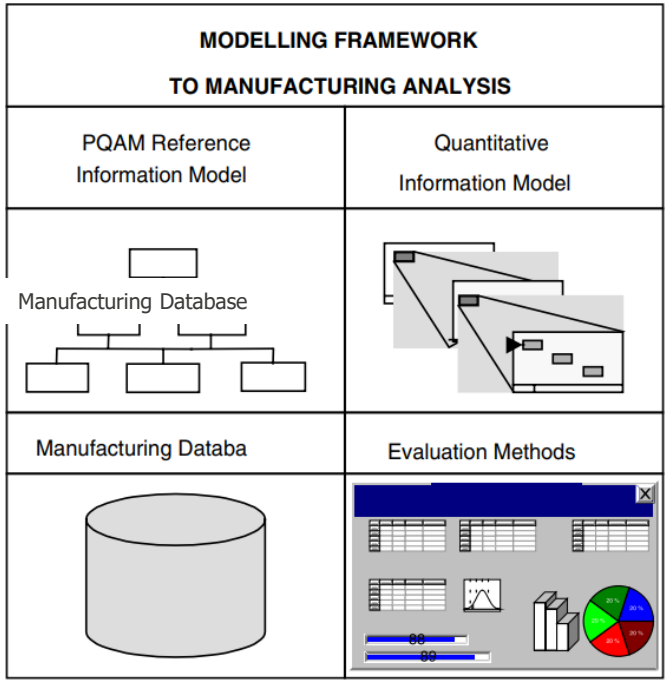
Production Metrics

- Average capacity used
- Peak capacity used
- Machine capacity used
- Stand time / Idle time
- Re-work quantity
- On time deliveries
- Back-order fill rate
- Inventory accuracy
- Overtime hours to total hours



J.C. Hernandez-Matias et al., Robotics and Computer-Integrated Manufacturing 24, 2008

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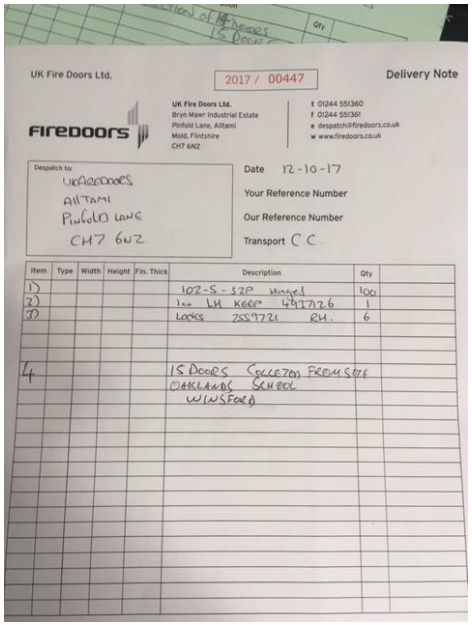
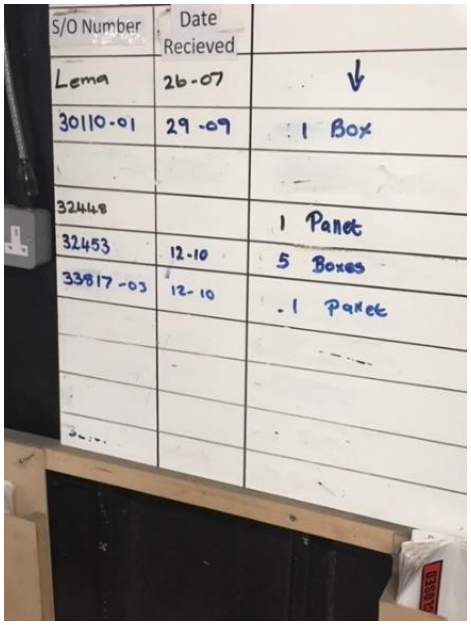
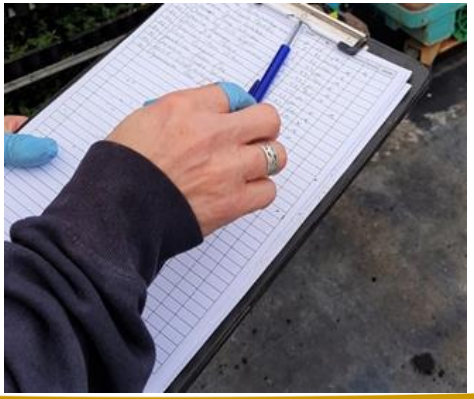
The Reality







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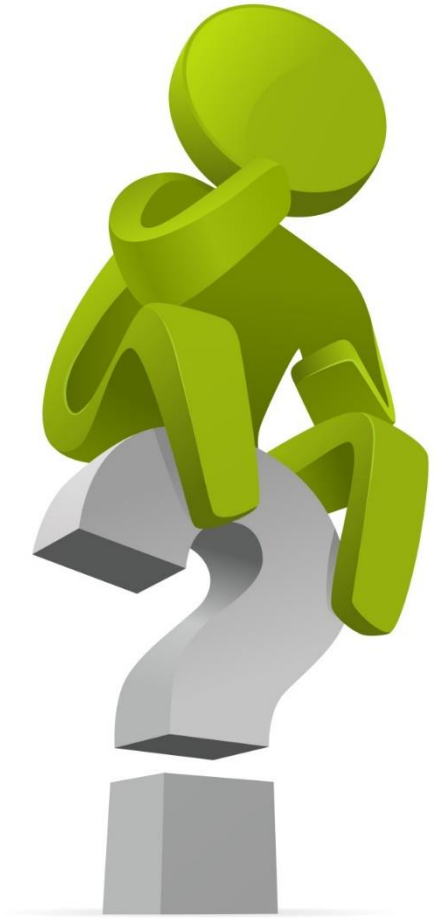
Scope your Process

- describe the process flow step by step
- what Data is captured
- what are the events
- what are the relationships in the Data Captured



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Master Route Card

1. Goods-In
2. Beam saw Cores
3. Beam saw Substrates
4. Lipping Preparation
5. Calibration
6. Press
7. Trimming
8. CNC production
9. Edge bander
10. Glazing & Ironmongery
11. Despatch

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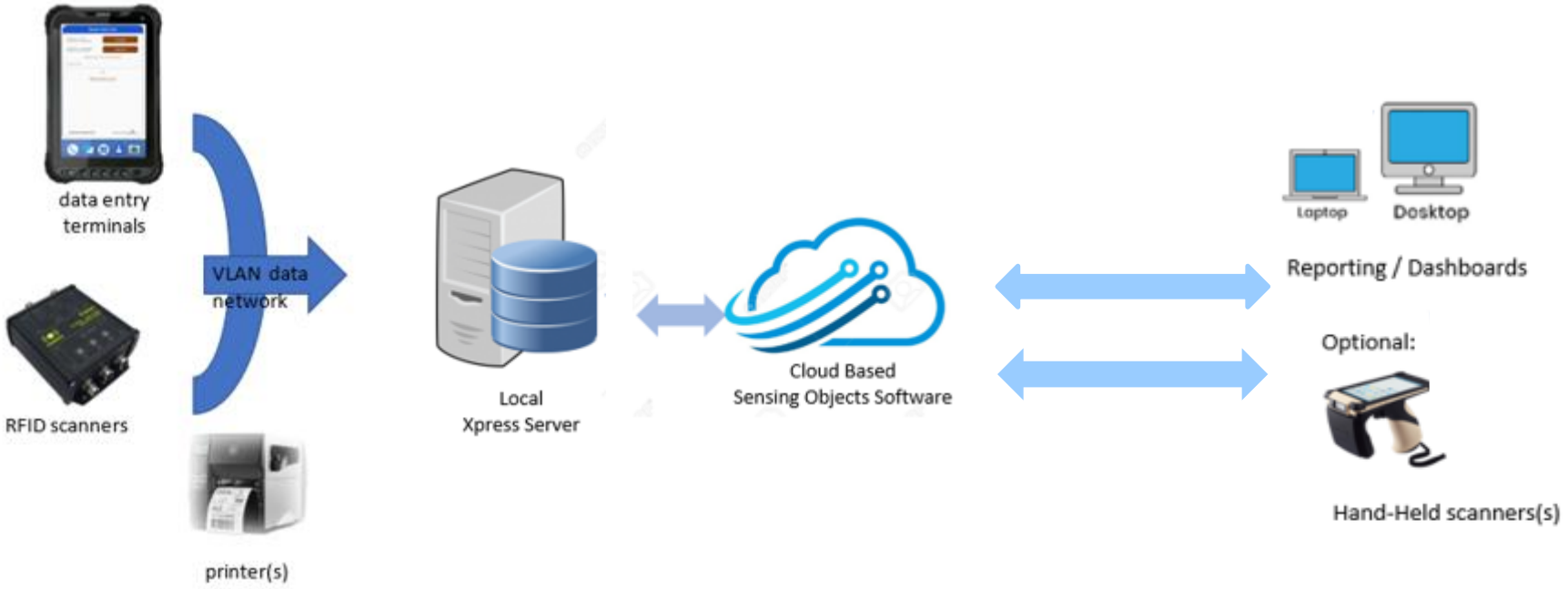
Data Capture



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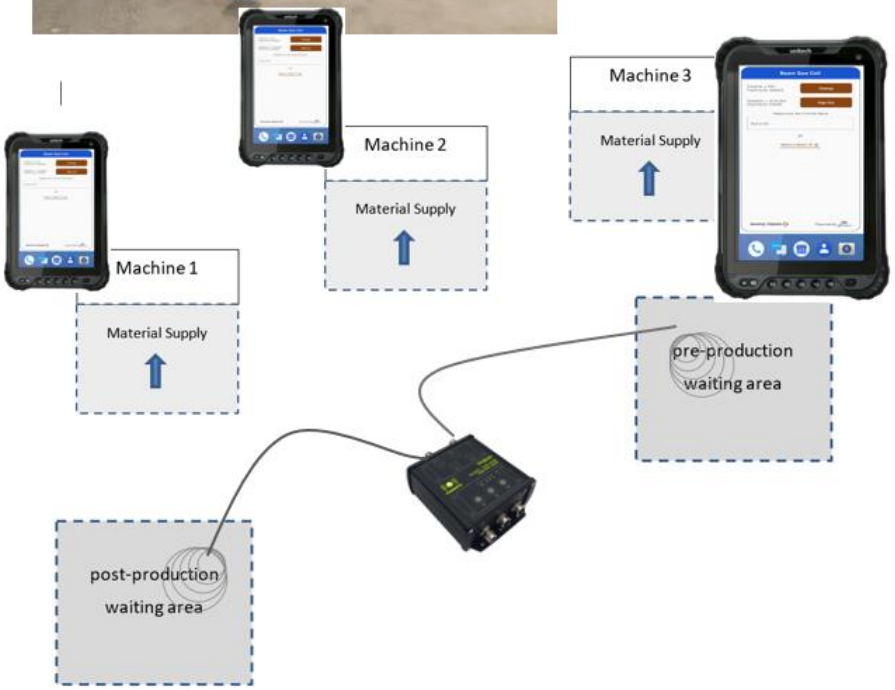

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RFID in Timber Manufacturing

Measuring

Key Performance Indicators

- Identifying production batches (UHF RFID)
- Identifying individual products (UHF RFID)
- Recording stoppages
- Recording idle time
- Recording actual production time

Sample top level KPIs

$$\text{Effectiveness} = \frac{\text{Planned Batch Time}}{\text{Overall Batch Elapsed Time - Break}} = \frac{58}{130} = 45\%$$

$$\text{Efficiency} = \frac{\text{Planned Batch Time}}{\text{Actual Run Time}} = \frac{58}{110} = 53\%$$

$$\text{\% Non Prod. Time} = \frac{\text{Non Productive Time}}{\text{Overall Batch Elapsed Time - Break}} = \frac{37}{130} = 28\%$$

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Sample Observations

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
4	ProjectNo	PhaseNo	BatchID	BatchQty	ItemNo	DoorNo	Component	WOID	Loc1Code	Loc1Desc	Loc1Start	Loc1BatchProcTime	Loc2Code	Loc2Desc	Loc2Start	Loc2BatchProcTime	Lo
5	37965	304	2962	10	1	296243.D01	Single	32966	GOODIN	Goods In (GOODIN)	2020-12-10 00:00:00.00	11.00	BEAM	Beamsaw Cores (BEAM)	2020-12-14 00:00:00.00	31.00	LS
6					1	296243.D02	Single	32967									
7					1	296243.D03	Single	32968									
8					1	296243.D04	Single	32969									
9					1	296243.D05	Single	32970									
10					1	296243.D06	Single	32971									
11					1	296243.D07	Single	32972									
12					1	296243.D08	Single	32973									
13					1	296243.D09	Single	32974									
14					1	296243.D10	Single	32975									
15	37965	308	2963	2	1	296511.D01	Single	33147	GOODIN	Goods In (GOODIN)	2020-12-11 00:00:00.00	3.00	BEAM	Beamsaw Cores (BEAM)	2020-12-15 00:00:00.00	7.00	LS
16					1	296511.D02	Single	33148									

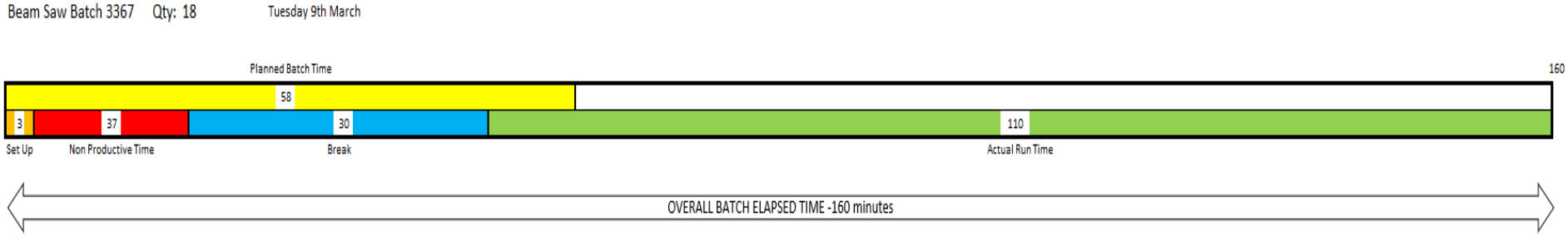
Batch-ID

What the ERP tells us

WorksOrder-ID

Scheduled date in Pre-production waiting area

Theoretical Process Time, Incl. Setup time



The reality measured

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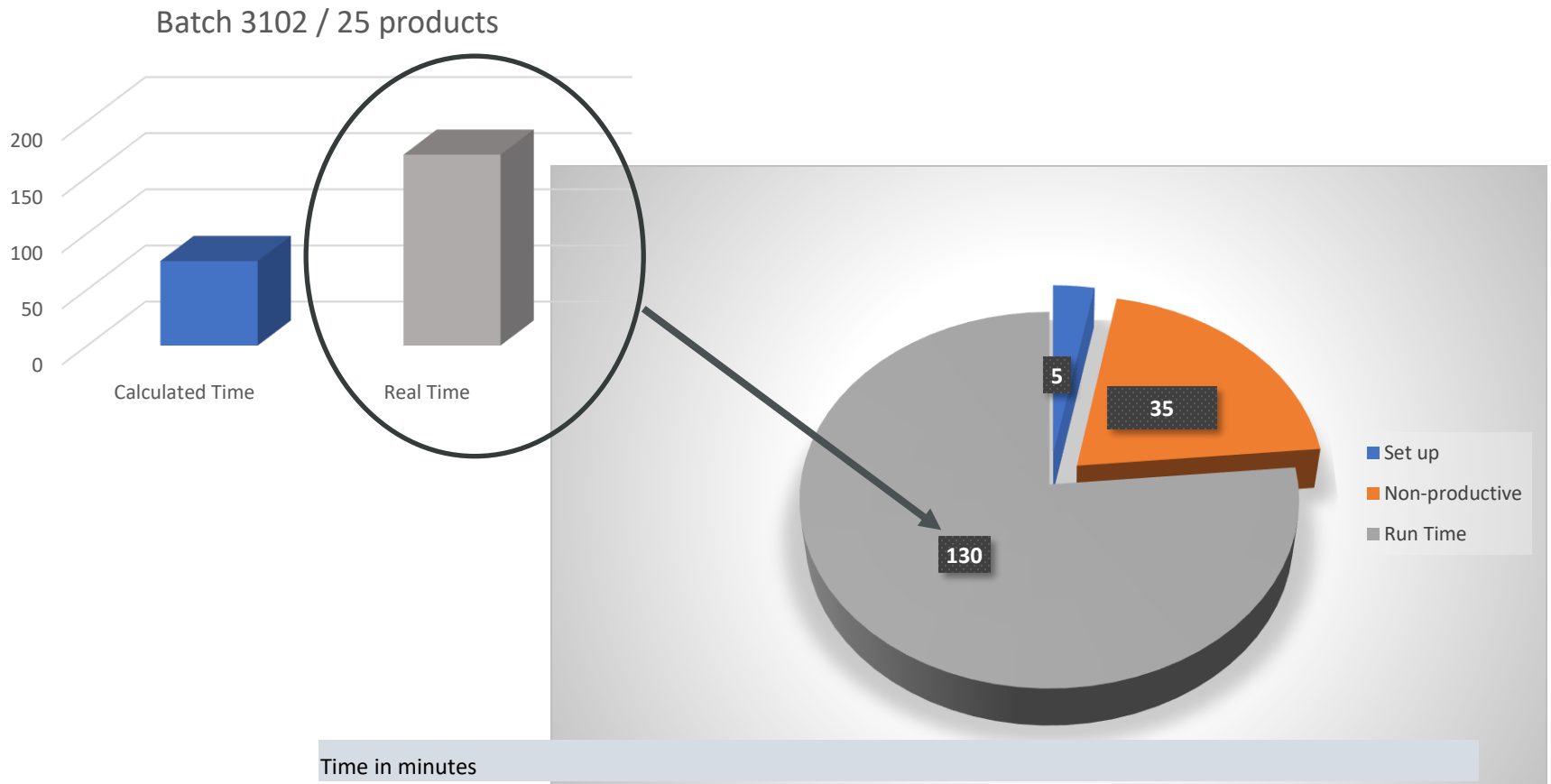
Production of 25 units



Time in minutes

Batch	Qty	Calculated Time	Real Time	Set up	Non-productive	Run Time
3102	25	75.25	170	5	35	130

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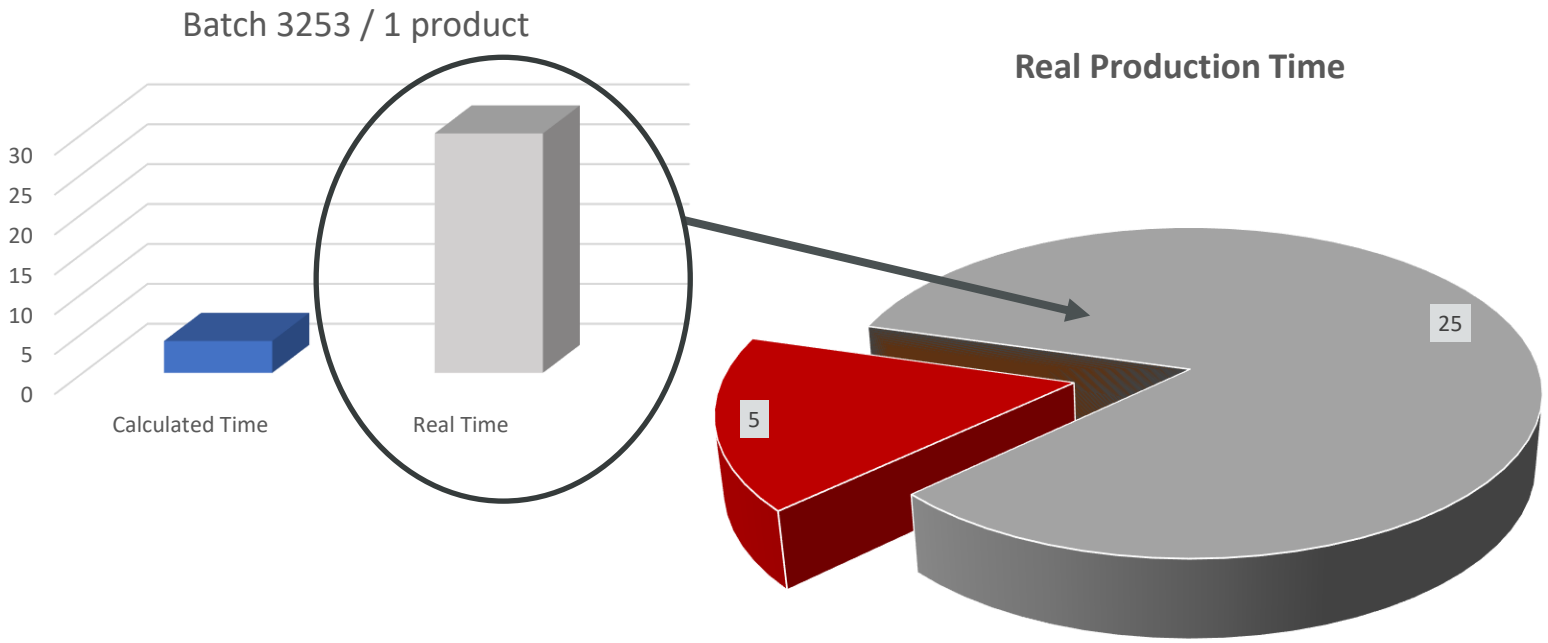
Production of a single unit



		Time in minutes				
Batch	Qty	Calculated Time	Real Time	Set up	Non-productive	Run Time
3253	1	4	30	5	0	25

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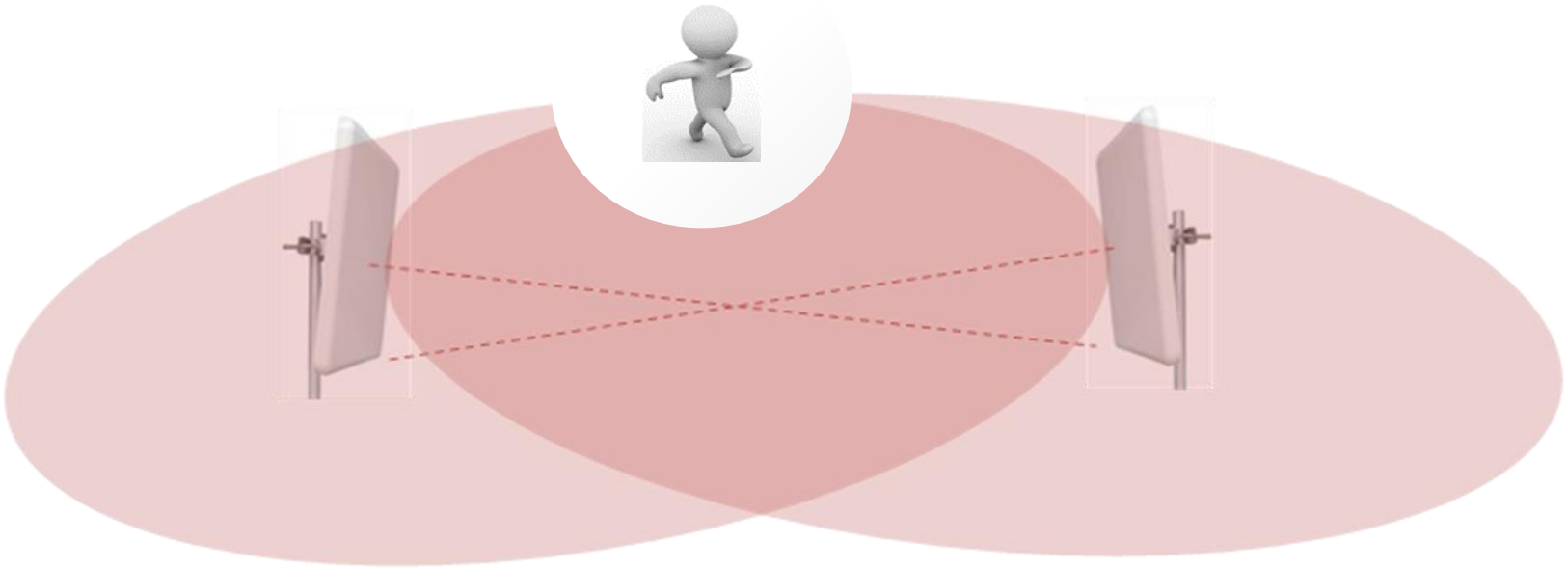
External Influences



Variables to keep in mind:

- ✓ Human interaction
- ✓ Liquids and Metals
- ✓ Moisture content in the assets
- ✓ Stray reads (the signal bounced off some metal in the environment)

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Identifying Products

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Identifying Products

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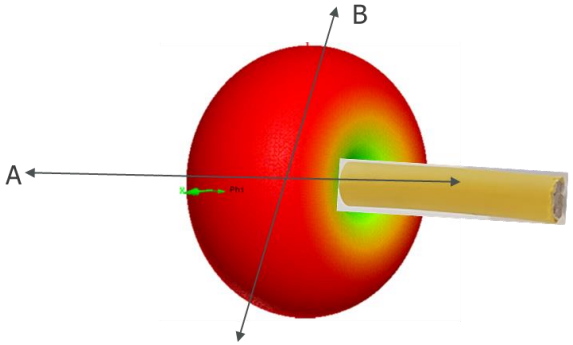
RFID Dowel for Timber Applications

Technical Specifications

- ✓ Size : Ø8 x 35 mm
- ✓ Material : PET with flame retardant Polyolefin cover
- ✓ Type : UHF RFID NXP UCODE-8 chipset
- ✓ Standard : EPCglobal Class 1 Gen2 / ISO18000-6C



Radiation pattern in free air

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Placing the Dowels

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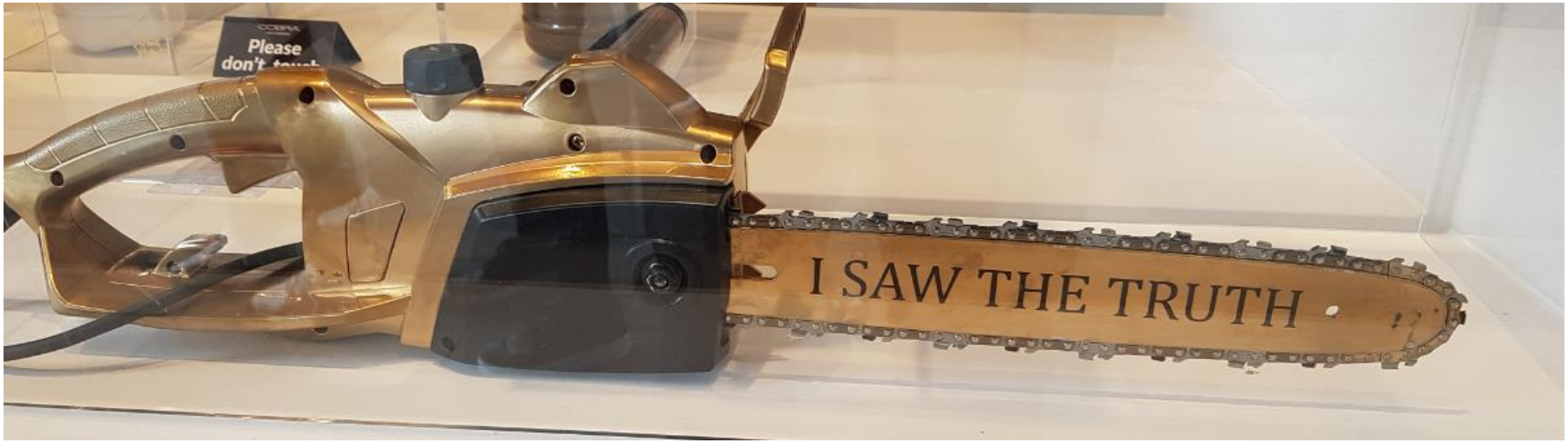
Conclusion for Manufacturing



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