

Sagar Optimization

Lean 4.0 Improvement Projects



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MOST Time Study - Assistor & Weighing New Process

Assistor MOST Study

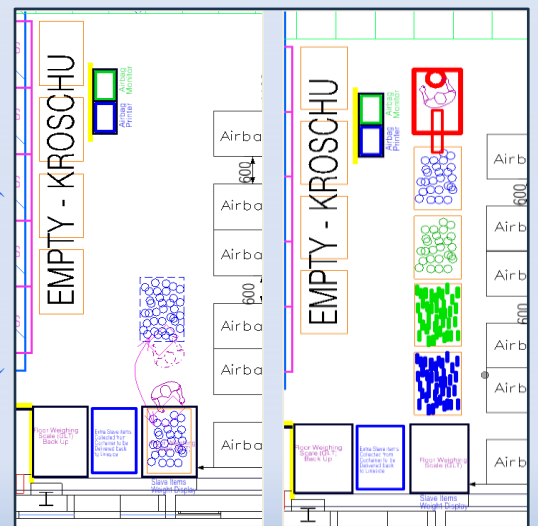
Nr.	Tätigkeit - Beschreibung Activity - Description	Code Code Nr.	TMU	= 0,783 Min. = 47 Sek. = 1,305 TMU					
				Berechnung Calculation					
			TTB	TTU					
005	Walk 1 metre and get assistor from park position	S-KAV	25	1	1	1	1	25	
010	Walk back 1 meter with assistor at load unload position	S-KAV	25	1	2	1	1	50	
015	Walk average 4 meters to full container	S-KAV	25	4	1	1	1	100	
020	Pull full container average 4 meter from full harness lane (Start stop)	L-TFSXA	35	1	1	1	1	35	
025	Pull full container average 4 meter from full harness lane	L-TFMXA	25	4	0.2	1	1	17	
030	Pallet alignment	L-TFAXA	80	1	1	1	1	80	
035	Opening of GLT	L-TFAXB	108	0.2	1	1	1	18	
040	Reach and pull tray	S-KAV	25	2	1	1	1	50	
045	Get assistor and move 1 meter inline to full harness container	S-KAV	25	1	2	1	1	50	
050	Lower assistor 1 meter and hook up main harness bag	S-KAV	25	4	1	1	1	100	
055	Raise assistor 1 meter up with main harness bag	S-KAV	25	3	1	1	1	75	
060	Get assistor and move 1 meter inline to full harness container	S-KAV	25	1	2	1	1	50	
065	Lower assistor 1 meter and hook up main harness bag	S-KAV	25	4	1	1	1	100	
070	Pick up scanner and scan x2 barcodes	L-RDBXV	103	1	1	1	1	103	
075	Unhook harness bag and raise assistor 1 meter up	S-KAV	25	4	1	1	1	100	
080	Walk back 1 meter with assistor to park position	S-KAV	25	1	2	1	1	50	
085	Pick wooden board and place aside next to harness container	L-TFSXD	105	2	0.3	1	1	70	
090	Pick 2 wooden board and place into empty container	L-TFSXD	105	2	0.2	1	1	35	
095	Push empty container 6 meter	L-TFSXA	35	6	0.2	1	1	35	
100	Turn 45 degrees	L-TFKXA	8	2	1	1	1	16	
105	Push empty container average 4 metres	L-TFSXA	35	4	0.2	1	1	23	
110	Walk 10 meters to Harness load unload point	S-KAV	25	10	0.2	1	1	42	
115	Walk average 4 meters at COS location with harness loaded assistor	S-KAV	25	4	2	0.1	1	14	
120	Walk back average 4 meters at assistor parking position	S-KAV	25	4	1	0.1	1	7	
125	Reach and pull tray	S-KAV	25	2	0.1	2	1	7	
130	Lower assistor	S-KAV	25	4	0.1	2	1	14	

Weighing MOST Study

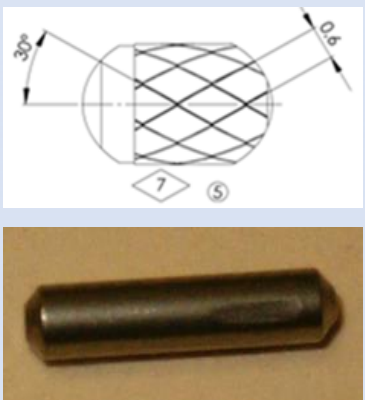
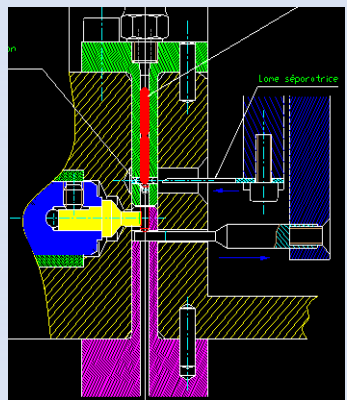
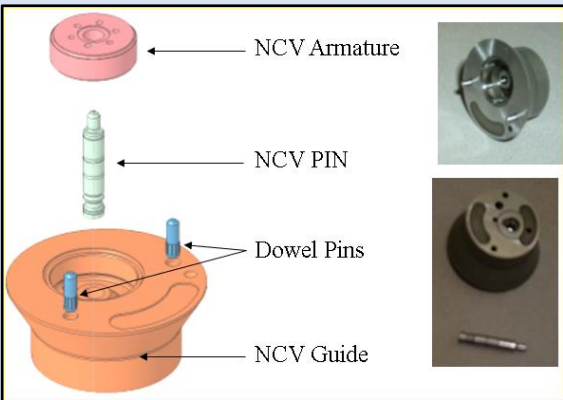
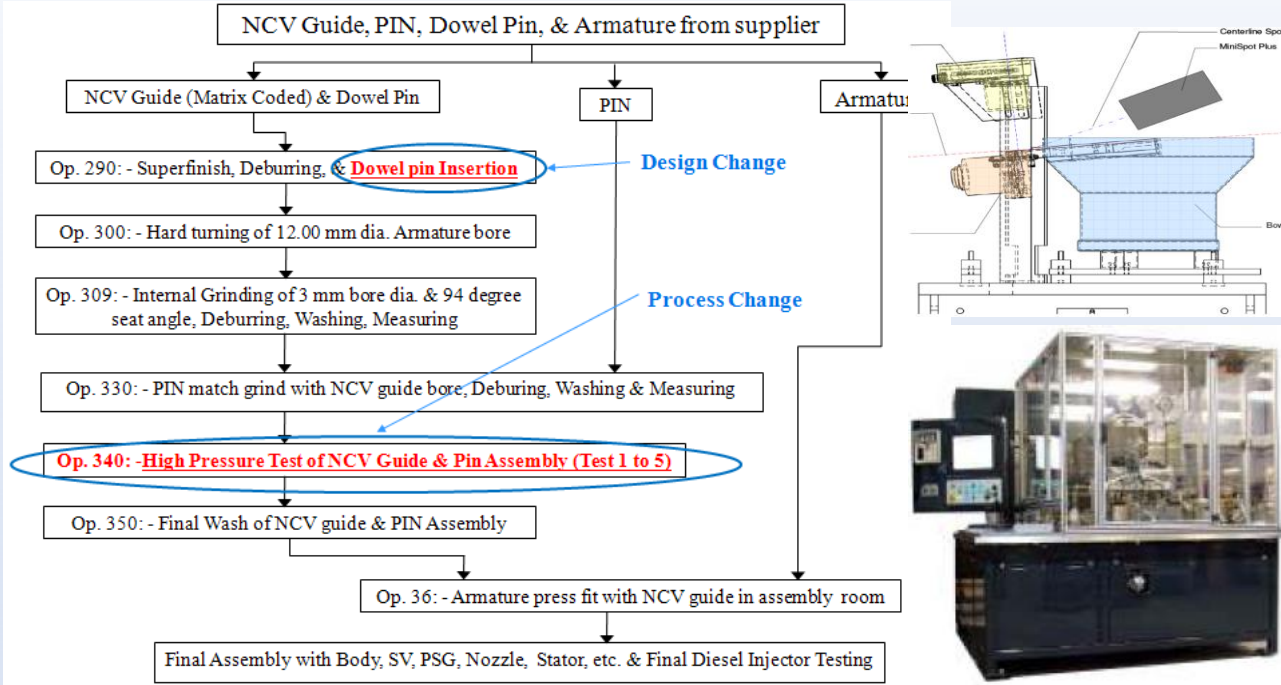
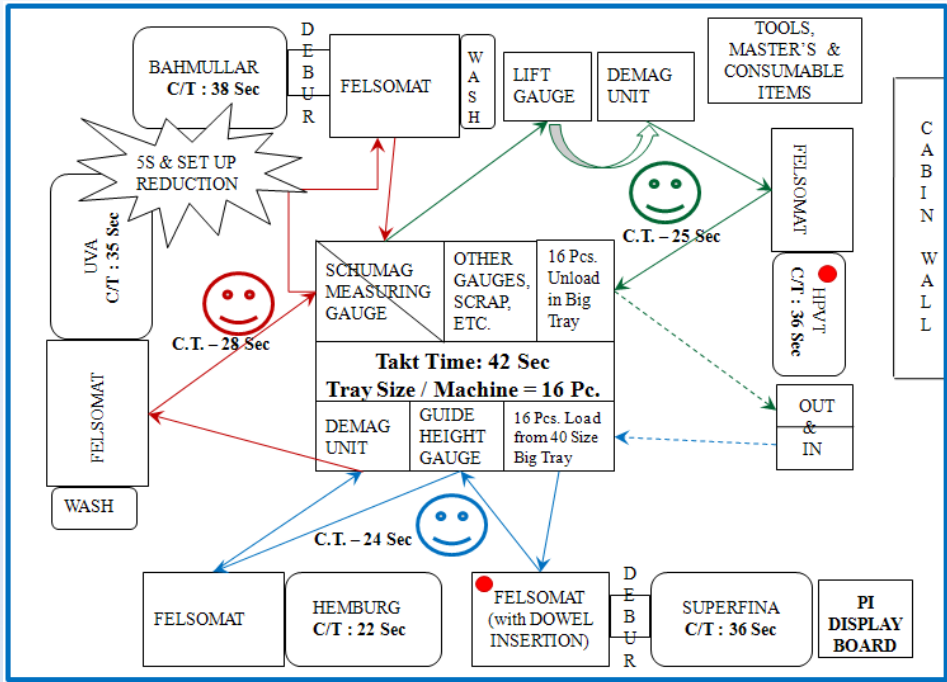
Nr.	Tätigkeit - Beschreibung Activity - Description	Code Code Nr.	TMU	= 14,366 Min. = 861 Sek. = 23,943 TMU					
				Berechnung Calculation					
			TTB	TTU					
005	Walking avg. 5m KROSCHU empty lane from printer	S-KAV	25	5	1	1	1	125	
010	Start stop value	L-TFSXA	35	1	1	1	1	35	
015	Pull empty container >50kg 5m	L-TFMXA	25	5	1	1	1	125	
020	Curves	L-TFKXA	8	2	1	1	1	16	
025	Additional alignment (putting onto scale)	L-TFAXA	80	1	1	1	1	80	
030	Walk 18m to Drax empties	S-KAV	25	18	1	1	1	450	
035	Curves	L-TFKXA	8	2	1	1	1	16	
040	Pull empty container >50kg avg. 5m	L-TFMXA	25	5	1	1	1	125	
045	Push empty to Line 30 (160m max.)	L-TFMXA	25	160	1	1	1	4,000	
050	Curves	L-TFKXA	8	4	1	1	1	32	
055	Pallet exchange per m	L-TFSXA	35	4	1	1	1	140	
060	Additional alignment (footprint)	L-TFAXA	80	1	1	1	1	80	
065	Push full slave container 160m >50kg	L-TFSXB	45	160	1	1	1	7,200	
070	Curves	L-SFWXX	102	4	1	1	1	204	
075	Push >50kg additional 8 m	L-TFSXB	45	8	1	1	1	360	
080	Walk to KLT and back	S-KAV	25	2	2	1	1	100	
085	Fill KLT with slave parts from GLT	S-KAV	25	15	20	1	1	7,500	
090	Walk 1m to scale with full KLT	S-KAV	25	1	1	1	1	25	
095	Empty KLT	S-KAV	25	3	20	1	1	1,500	
100	Walk 1m with empty KLT to GLT	S-KAV	25	20	1	1	1	500	
105	Check weight on scale	L-EFSXM	91	3	1	1	1	273	
110	Pull full GLT 5m	L-TFSXB	45	5	1	1	1	225	
115	Walk	S-KAV	25	2	1	1	1	50	
120	Pull empty container 18m	S-KAV	25	18	1	1	1	450	
125	Curves	L-TFKXA	8	2	1	1	1	16	
130	walk 12m to printer	S-KAV	25	12	1	1	1	300	
135	Curves	L-TFKXA	8	2	1	1	1	16	

STEP - 3 Empty KROSCHU move (0.25 Minutes)
STEP - 1 Lineside Collection (Max- 7.55 Minutes)
STEP - 2 Weighing Process (6.56 Minutes)

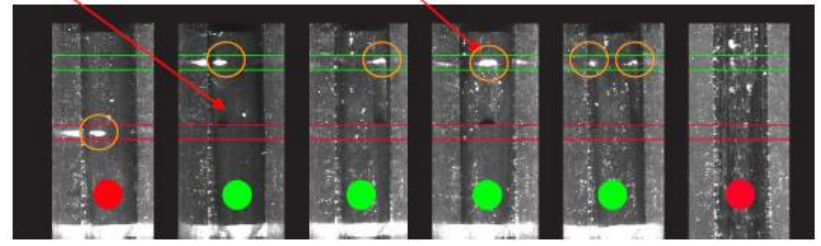
- Weighing/Airbag Seq. MTM Time: - 14.35 Minutes
- Maximum lineside collection distance 160 meters.
- Maximum 4 GLT weighing requires for 1 type slave item.
- 700 Quantity daily slave item weighing.
- Daily Weighing plan:
 - > Day 1: Blue & Green Sleeve: 2 GLT
 - > Day 2: Large Black Collor: 2 GLT & Large White Collor: 2 GLT
 - > Day 3: White Black Sleeve: 1 GLT & Small Black Collor: 1 GLT
 - > Day 4: Brown Sleeve: 1 GLT
- Daily product types deliver 4 GLT container slave items to W1 canopy area for weekly Type 2 delivery



Precision Grinding Cell & Product Improvement Design Projects

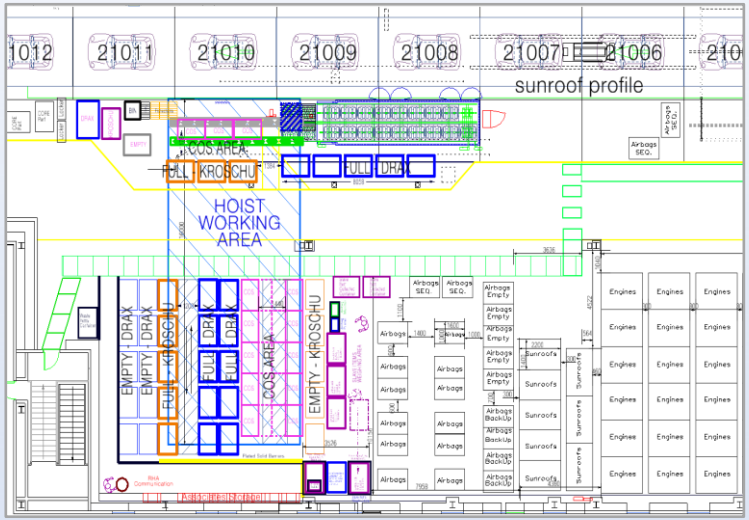


The 6 images below show the new dowels and are taken with the camera and the use of the new light. The bright trapezoid reflections are used as a recognition characteristic. There are some additional characteristics which ensure to recognize the actual orientation. Image 2 is with optimized exposure time.

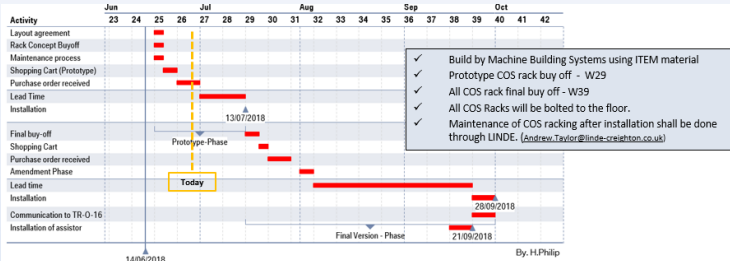


Inhouse Digitalized Lean 4.0 Logistic Supply Project

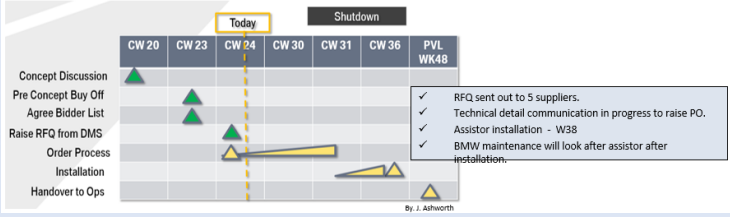
Proposal Area Layout



Project Execution Timeline



ASSISTOR TIMELINE

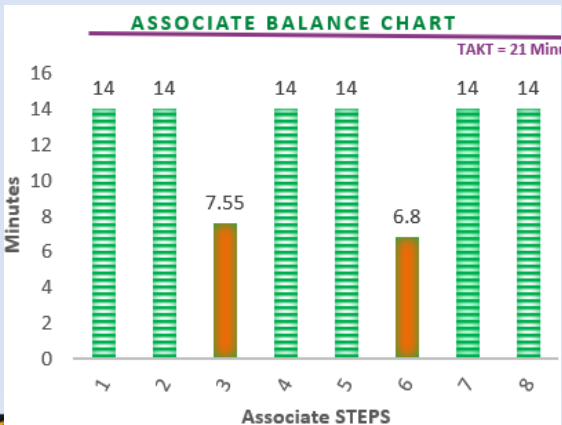


New Process Flow Overview

- 1) All slave items collection at lineside will be in individual supplier's container for once a week return delivery.
- 2) Weighing associate pull Type 1 empty container from Type empty lane.
- 3) Weighing associate collect plan for slave items: (Around 40 minutes per day require for weighing operation by weighing associate. (2 seconds / car))

- (D1) All Cable ties - L2-14L (25 Meters) 4 or 1 GLT
- (D2) Big size Black collar - L2-14L (25 Meters) 2 GLT
- (D2) Big size white collar - L2-14L (25 Meters) 2 GLT
- (D3) Blue Sleeve - L5-11R (60 Meters) 2 GLT
- (D3) Green Sleeve L5-11R (60 Meters) 2 GLT
- (D4) Small Black collar – L6-12R (65 Meters) 1 GLT
- (D4) Black White Sleeve – L8-10R (85 Meters) 1 GLT

Balance Chart / IT Solution to track inhouse supply / Sign Off Sheet



08:44:37 FS: 59
 Harness COS Control-TEST
 Order No: 6476344
 Seq No: -
 Einstein Seq: 2009004
 Order No: 6476344
 Stream: BEV

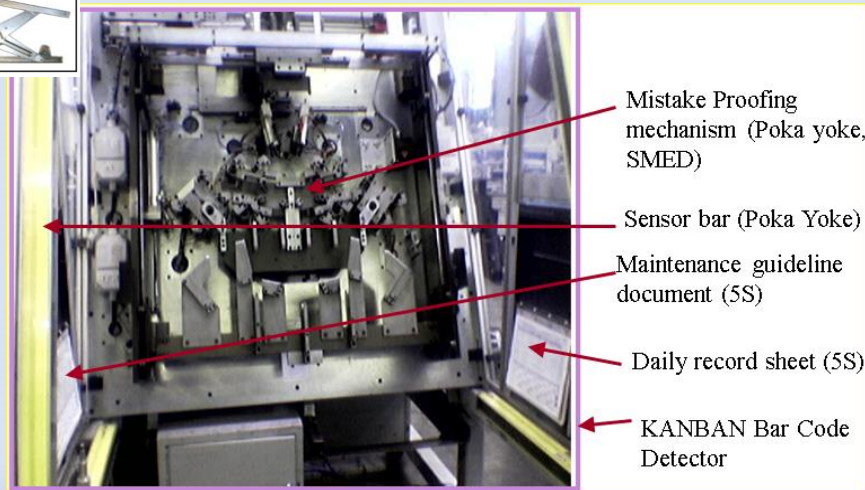
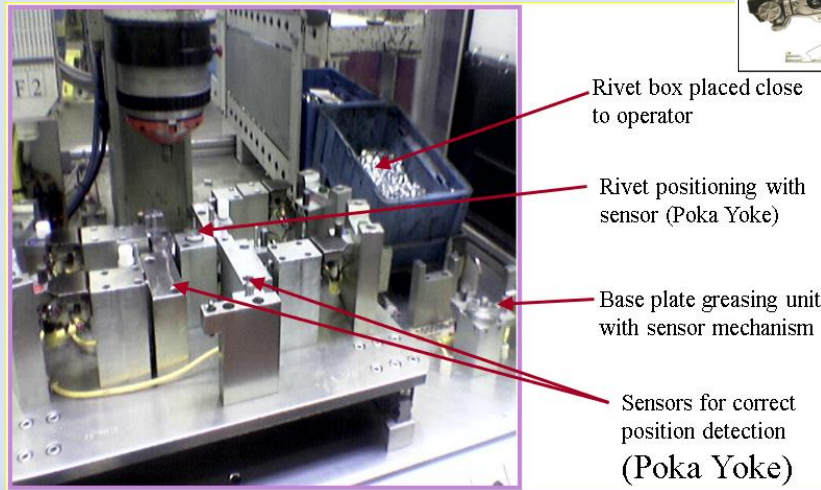
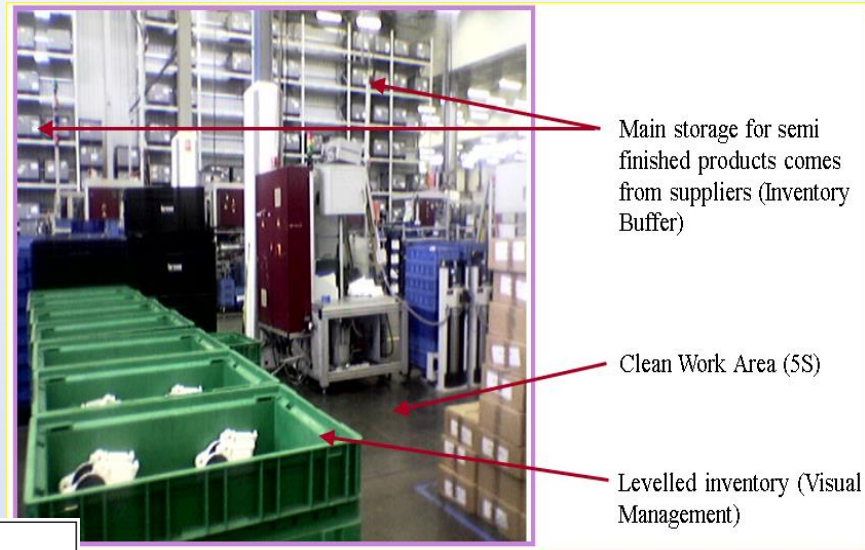
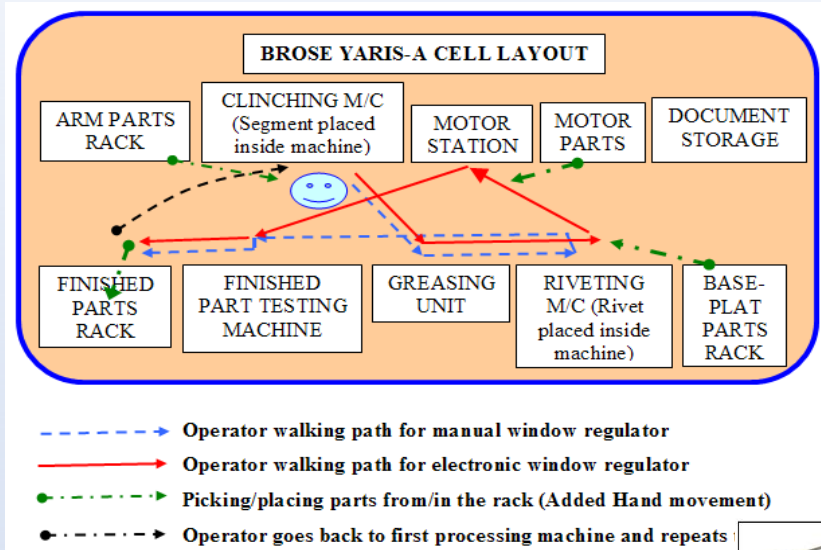
08:41:59 FS: 59
 Harness COS Control-TEST
 Order No: 6696499
 Seq No: -
 Einstein Seq: 2009003
 Order No: 6696499
 Stream: MAIN

Phasenstatus / Fließende Departments		Verfertiger / Produktion	
TR-D-11	Line	Line	Line
TR-D-12	Line	Line	Line
TR-D-13	Line	Line	Line
TR-D-14	Line	Line	Line
TR-D-15	Line	Line	Line
TR-D-16	Line	Line	Line
TR-D-17	Line	Line	Line
TR-D-18	Line	Line	Line
TR-D-19	Line	Line	Line
TR-D-20	Line	Line	Line
TR-D-21	Line	Line	Line
TR-D-22	Line	Line	Line
TR-D-23	Line	Line	Line
TR-D-24	Line	Line	Line
TR-D-25	Line	Line	Line
TR-D-26	Line	Line	Line
TR-D-27	Line	Line	Line
TR-D-28	Line	Line	Line
TR-D-29	Line	Line	Line
TR-D-30	Line	Line	Line
TR-D-31	Line	Line	Line
TR-D-32	Line	Line	Line
TR-D-33	Line	Line	Line
TR-D-34	Line	Line	Line
TR-D-35	Line	Line	Line
TR-D-36	Line	Line	Line
TR-D-37	Line	Line	Line
TR-D-38	Line	Line	Line
TR-D-39	Line	Line	Line
TR-D-40	Line	Line	Line
TR-D-41	Line	Line	Line
TR-D-42	Line	Line	Line
TR-D-43	Line	Line	Line
TR-D-44	Line	Line	Line
TR-D-45	Line	Line	Line
TR-D-46	Line	Line	Line
TR-D-47	Line	Line	Line
TR-D-48	Line	Line	Line
TR-D-49	Line	Line	Line
TR-D-50	Line	Line	Line

- 4) Associate transfer slave items from DRAX container into empty KROSCHU container and push onto weighing scale.
- 5) Associate perform selection and checks weight as per weight chart, print label and stick onto container.
- 6) Associate move finished container in storage lane (Maximum 4 containers per day)
- 7) Associate move Type 1 container either at lineside and collect another slave item container from lineside OR move in Type 1 empty lane.
- 8) Main harness delivery associate toe 4 containers of slave items into ILC racking Type 2 storage area.

Manufacturing Cell Design for Single Piece Flow


*Takt Time = Available time / Customer Demand = 34 Seconds (**ONE PIECE FLOW**)*




Inhouse Complete Supply Solution Improvement

Project complete overview


Agreed with:



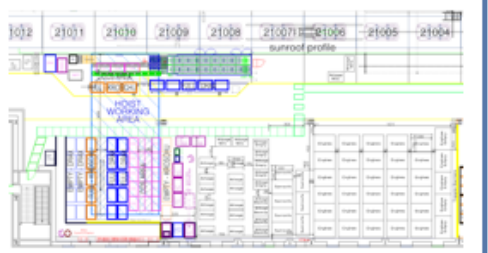
Agreed with:



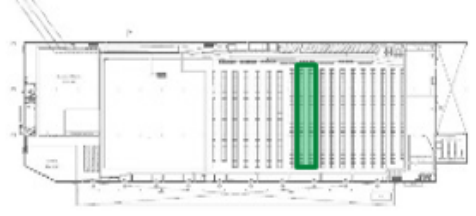
Agreed with:



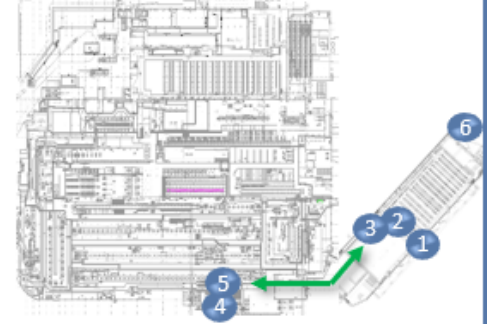
Line Side Layout



Warehouse Layout



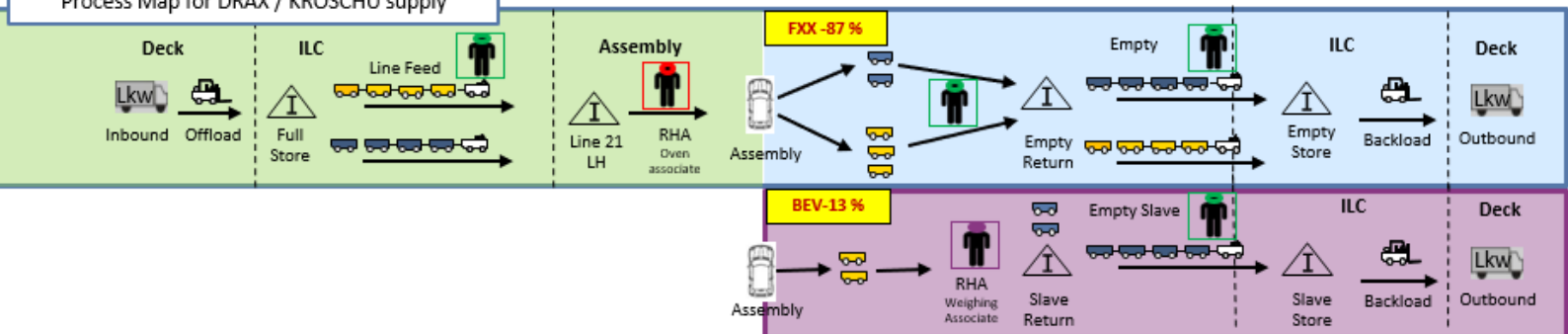
Material Flow



Open Points

<ol style="list-style-type: none"> 1. At PVL Sorting of empties (slave parts) 2. BIVS Call for 5x Drax. & 5x Kroschu 3. IPS/KRS set up for PVL 4. Lineside sorting layout mock up trial 5. COS process at PVL through Launch 	<ul style="list-style-type: none"> → Mixed slaves return accepted by KROSCHU. → CW 39- Setup before Assistor installation → CW 29- Test setup using KROSCHU Barcode → CW 34- Wednesday start till CW 35 Monday → KRS set & Launch Store / L.Champ. for COS seq.
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Process Map for DRAX / KROSCHU supply

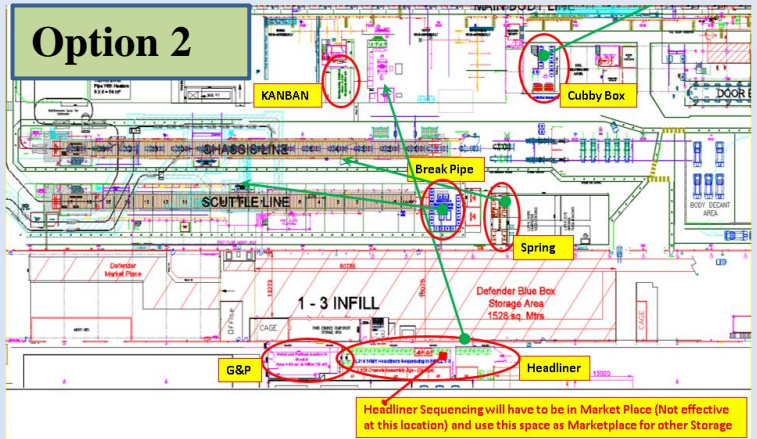
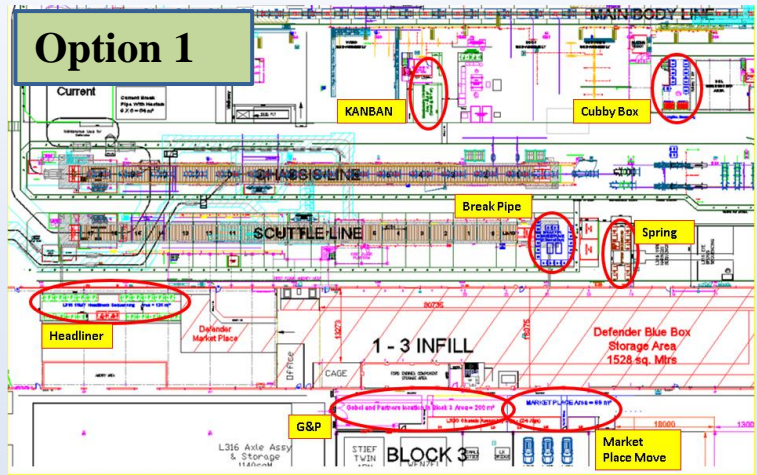


Current Area View



- For weighing process storage area requires to be re-layout as per proposed lineside layout.
- Head airbag sequence associate will be fully utilized from 63% by moving next to harness area.
- IT solution setup will be installed in ILC area for dedicated 5 containers of Type 1 & 5 containers of Type 2 delivery to lineside.
- Topple Barrier, electrical, floor marking and H&S work requires as engine seq. area associates working next to high stacked pallets.
- Gaining extra storage lane for engine full pallet & empty pallet to accommodate future storage.
- Warehouse space shall gradually balance between 2 supplier only temporary storage space requires in the nearby warehouse aisle area.

Process Improvement Layout Proposal & Cost saving Projects



- Proposed locations within assembly close to fitpoint for new/combined sequencing facility.
- Involved many internal stakeholders like Health and Safety, AME, CME, Contractor, Operations, DHL, etc. for buying off proposals.

Total Cost of DHL operators p.a. + Cost of facility and specialised equipment

£90,000 + @ £40,000

= **£1,30,000 in 1st year, £90K in subsequent years)**

Year	Current Costs	Potential Costs	Projected Savings
1	£180K	£130K	£50K
2	£180K	£90K	£90K
3	£180K	£90K	£90K
4	£180K	£90K	£90K
5	£180K	£90K	£90K

Advantage of in-house repairing:

- Regular saving of £90K p.a.
- No extra maintenance facility requires as existing facility will be shared with current production repair process.
- No need to manage and liaise with external bogie repair contractor.
- Incidental damage to Bogies can be tracked to respective operator logistic partner can be asked for a recharge, so costs can reduce even further.
- Time-period for repairs can be controlled & 12-month cycle can be followed.

Disadvantage of in-house repairing:

- Continue to takes up some space on-site.
- JLR Will require some time to change procedures.
- Initial investment required for equipment and may need yearly maintenance as well.