



Logistical complexity on fully integrated production of socks and tights in perspective by enterprise - software

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Socks and tights are under control of fashion and fast moving trends. This means in matters of sourcing socks and tights always shorter manufacturing time slot by higher style-diversity and drooping lot-size with high quality-claim. On the other hand the production of socks needs a high in-house production depth.

Our software-house is engaged since more then 20 years on developing and distributing enterprise-software to plan and control textile-production. Based on my experience I want to deliver inside of the logistic complexity on fully integrated production of socks and tights in perspective by enterprise-software.

The lecture will show

- the changing of quantity-units during the production-process starting from customer-order until shipment.
- the concept of “style”, “set”, “bag”, “box” and “assortment”
- the term of “customer-order”, “production-order”, “manufacturing-order”, “tracking-order”, “boarding-order” and “shipment-order”
- planning and sourcing of raw-material
 - needs
 - date of availability
- raw-planning of capacity
 - each manufacturing-stage by continuous process
 - reservation of capacity
 - calculation date of process-start
 - efficiency
- fine-planning and production-control
 - manufacturing-order
 - material-reservation
 - rout-card-ticket; mobile-registration-system
 - progress-control
- tracking-order
 - synchronization of manufacturing-order in order of set
- boarding-order
 - pack in order of box
- shipment-order
 - pack in order of assortment

style (pair socks)	concept																									
Definition <ul style="list-style-type: none"> • style-number • colorway-number • size-grid Instruction <ul style="list-style-type: none"> • construction-plan (knitting, toe-seaming) • part-list (yarn) 	<table border="1"> <thead> <tr> <th>Style-no</th> <th>colorway</th> <th>Size 1</th> <th>Size 2</th> <th>Size 3</th> </tr> </thead> <tbody> <tr> <td>4711</td> <td></td> <td>100 39/42</td> <td>43/46</td> <td>47/50</td> </tr> <tr> <td></td> <td></td> <td>200 39/42</td> <td>43/46</td> <td>47/50</td> </tr> <tr> <td>5012</td> <td></td> <td>100 39/42</td> <td>43/46</td> <td>47/50</td> </tr> <tr> <td></td> <td></td> <td>200 39/42</td> <td>43/46</td> <td>47/50</td> </tr> </tbody> </table>	Style-no	colorway	Size 1	Size 2	Size 3	4711		100 39/42	43/46	47/50			200 39/42	43/46	47/50	5012		100 39/42	43/46	47/50			200 39/42	43/46	47/50
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Set (selling unit)	concept																																																																																																
Definition <ul style="list-style-type: none"> • assembly of styles <ul style="list-style-type: none"> ◦ same style-no and colorway and same size-no ◦ same style-no different colorway and same size-no ◦ different style-no and colorway but same size-no Instruction <ul style="list-style-type: none"> • construction-plan (boarding) • part-list (stickers, banderol) 	<table border="1"> <thead> <tr> <th>Style-ty</th> <th></th> <th>Set A</th> <th>Set B</th> <th>Set C</th> <th>Set D</th> <th>Set E</th> <th>Set F</th> </tr> </thead> <tbody> <tr> <td rowspan="3">4711</td> <td>100 39/42</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>43/46</td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>47/50</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> </tr> <tr> <td rowspan="3">200 39/42</td> <td>100 39/42</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>43/46</td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>47/50</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td rowspan="3">5012</td> <td>100 39/42</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>43/46</td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>47/50</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td rowspan="3">200 39/42</td> <td>100 39/42</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>43/46</td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>47/50</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> </tr> </tbody> </table>	Style-ty		Set A	Set B	Set C	Set D	Set E	Set F	4711	100 39/42	X						43/46			X				47/50					X		200 39/42	100 39/42	X	X					43/46			X	X			47/50					X	X	5012	100 39/42	X	X					43/46			X	X			47/50					X	X	200 39/42	100 39/42		X					43/46				X			47/50						X
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polybag (packing unit)	concept																												
Definition <ul style="list-style-type: none"> • amount of sets <ul style="list-style-type: none"> ◦ same set-no ◦ different set-no (assortment) Instruction <ul style="list-style-type: none"> • partlist (polybag, stickers) 	<table border="1"> <thead> <tr> <th>Set-Typ</th> <th>Polaybag A</th> <th>Polaybag B</th> <th>Polybag C</th> </tr> </thead> <tbody> <tr> <td>Set-A</td> <td>5</td> <td></td> <td></td> </tr> <tr> <td>Set-B</td> <td>5</td> <td></td> <td></td> </tr> <tr> <td>Set-C</td> <td></td> <td>5</td> <td></td> </tr> <tr> <td>Set-D</td> <td></td> <td>5</td> <td></td> </tr> <tr> <td>Set-E</td> <td></td> <td></td> <td>5</td> </tr> <tr> <td>Set-F</td> <td></td> <td></td> <td>5</td> </tr> </tbody> </table>	Set-Typ	Polaybag A	Polaybag B	Polybag C	Set-A	5			Set-B	5			Set-C		5		Set-D		5		Set-E			5	Set-F			5
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box (transportunit)	concept																
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customer-order (set oriented)	term						
Definition <ul style="list-style-type: none"> • quantity by set-no • deliverydate 	Set-typ	Set A	Set B	Set C	Set D	Set E	Set F
	quantity	1200	1200	900	900	600	600

production-order (style oriented)	term							
Definition <ul style="list-style-type: none"> • resulting quantity-unit for production-process oriented by style-no / colorway-no / size-no • using from stage knitting until to forming/pairing • brutto quantity (netto plus 3% expected 2.quality) 								
	PO-No	Style-typ Style-no	colorway	Size 1 39/42	Size 2 43/46	Size 3 47/50	Total	
	1	4711	100	1236	927	618	2781	
	2		200	2472	1854	1236	5562	
	3	5012	100	2472	1854	1236	5562	
	4		200	1236	927	618	2781	
	Total pairs gross						16686	
<ul style="list-style-type: none"> • resulting quantity-unit for production-process oriented by set • using for boarding and packaging 	Polybag-Typ		Quantity		Box-Typ		Quantity	
	Polybag A		80		Box A		16	
	Polybag B		60		Box B		12	
	Polybab C		40		Box C		8	
	Total bag		180		Total Carton		36	

planning and sourcing of raw-material	planning																																																																												
<p>Definition</p> <ul style="list-style-type: none"> • calculation date of availability • needs of quantity <ul style="list-style-type: none"> ◦ consider raw-material stock ◦ consider produced quantities ◦ consider by needs by manufacturing-stage (just in time) • raw-material ordering • raw-material confirmation 																																																																													
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<p>Prepereration</p> <ul style="list-style-type: none"> each knitting-machine gets on begin of daily-production a empty carton with a rout-card-ticket all produced socks are putting inside of box machine-number-barcode-sticker stuff-barcode-sticker (by shift) taking note of total produced quanti by hand <p>mobile-registraton</p> <ul style="list-style-type: none"> manufacturing-stage knitting <ul style="list-style-type: none"> after the daily-production collection on each machine the cartons with rout-card-ticket by using of mobile reader rigstraton of <ul style="list-style-type: none"> machine-no stuff-no by shift quanity of socks (piece) address of next following-up manufacturing-stage following-up manufacturing-stage <ul style="list-style-type: none"> carton get moved from stage to stage controled by order of root-card using of mobile reader registraton of <ul style="list-style-type: none"> stuff-no by shift quanity of missing socks and 2.quality 	<table border="1"> <thead> <tr> <th colspan="2">Machine Info</th> <th colspan="2">Reiders Info</th> <th>Prod Stage</th> <th>Description employee/work station</th> </tr> </thead> <tbody> <tr> <td>Lotnr: 40074304100</td> <td>Light press: 0:00 min.</td> <td></td> <td></td> <td>Burun</td> <td>Tea Spine - 30700 16.Numerik Teakyle Dimp 0:15 min.</td> </tr> <tr> <td>Color: Style</td> <td>2009.588 500061.00</td> <td></td> <td></td> <td>QC01</td> <td>Gate kontrol 1:00 kontrol 0:30 min.</td> </tr> <tr> <td>Color: Style</td> <td>Styeh-Furme 09.0026-12.0019</td> <td></td> <td></td> <td>Forming 1</td> <td>Dr Forme 1:00 On Forme 0:21 min.</td> </tr> <tr> <td>Product Order No:</td> <td>5.04.03.1.00</td> <td></td> <td></td> <td>Dye</td> <td>Remak L302 (V.kanta) PENYU 0:00 min.</td> </tr> <tr> <td>Desk No / File No:</td> <td>0000002 / Smpok</td> <td>Spelat</td> <td></td> <td>Dye</td> <td>Remak (KUMATA) KUMATA 0:00 min.</td> </tr> <tr> <td>Comment</td> <td>S2P CO BASIC </td> <td>Color: 0:00:00-00</td> <td>Location: 00</td> <td></td> <td></td> </tr> <tr> <td>Colour of The Sewing</td> <td>08.0077 Styah</td> <td>size</td> <td>area</td> <td></td> <td></td> </tr> <tr> <td>Prod Stage</td> <td>Flat</td> <td>30000</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Auto On</td> <td>0:00 am +/- 0:00</td> <td>20:00 am +/- 0:00</td> <td>Prod Stage</td> <td>1st Quality</td> <td>2nd Quality</td> </tr> <tr> <td>Auto On</td> <td>0:00 am +/- 0:00</td> <td>10:00 am +/- 0:00</td> <td>Burun</td> <td></td> <td></td> </tr> <tr> <td>Auto On</td> <td></td> <td>20:00 am +/- 0:00</td> <td>QC01</td> <td></td> <td></td> </tr> <tr> <td>Auto Topan</td> <td>04:00 am +/- 0:00</td> <td></td> <td>Forming 1</td> <td></td> <td></td> </tr> <tr> <td>Auto On</td> <td></td> <td>20:00 am +/- 0:00</td> <td>Dye</td> <td></td> <td></td> </tr> <tr> <td>Auto Topan</td> <td>20:00 am +/- 0:00</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Prod No</td> <td>505 / 21-1-2</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Prod Order No</td> <td>39/42 (1)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> 	Machine Info		Reiders Info		Prod Stage	Description employee/work station	Lotnr: 40074304100	Light press: 0:00 min.			Burun	Tea Spine - 30700 16.Numerik Teakyle Dimp 0:15 min.	Color: Style	2009.588 500061.00			QC01	Gate kontrol 1:00 kontrol 0:30 min.	Color: Style	Styeh-Furme 09.0026-12.0019			Forming 1	Dr Forme 1:00 On Forme 0:21 min.	Product Order No:	5.04.03.1.00			Dye	Remak L302 (V.kanta) PENYU 0:00 min.	Desk No / File No:	0000002 / Smpok	Spelat		Dye	Remak (KUMATA) KUMATA 0:00 min.	Comment	S2P CO BASIC	Color: 0:00:00-00	Location: 00			Colour of The Sewing	08.0077 Styah	size	area			Prod Stage	Flat	30000				Auto On	0:00 am +/- 0:00	20:00 am +/- 0:00	Prod Stage	1st Quality	2nd Quality	Auto On	0:00 am +/- 0:00	10:00 am +/- 0:00	Burun			Auto On		20:00 am +/- 0:00	QC01			Auto Topan	04:00 am +/- 0:00		Forming 1			Auto On		20:00 am +/- 0:00	Dye			Auto Topan	20:00 am +/- 0:00					Prod No	505 / 21-1-2					Prod Order No	39/42 (1)				
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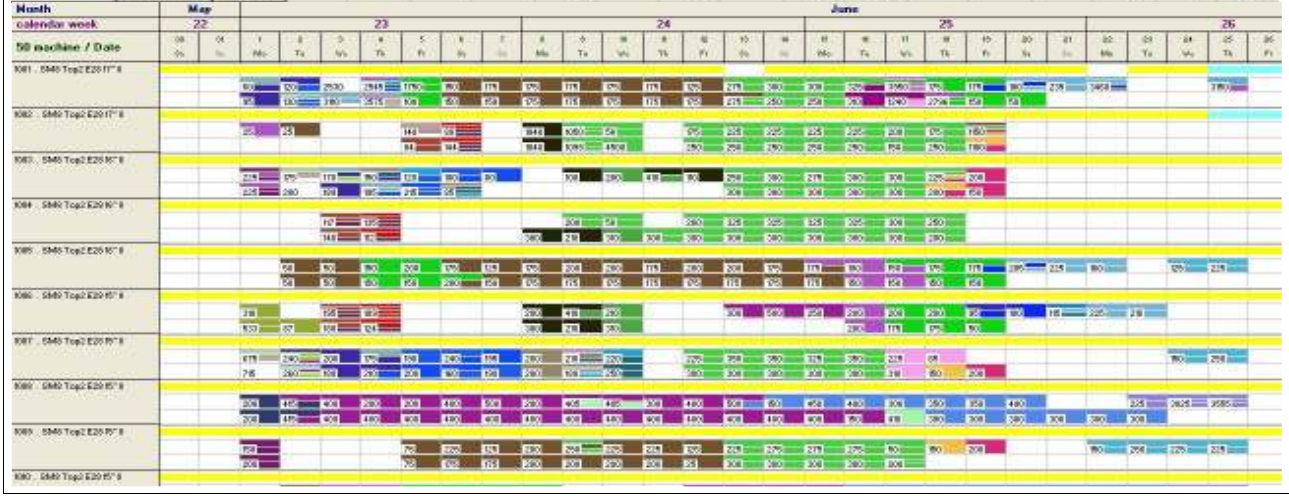
- adresse of next following-up manufacturing-stage

Production-control and detail-planning | Detail-planning and production-control

Definition

- control the aberration of daily capacity of produced socks by manufacturing-stages
- depends on aberration of revise raw-planning
- control the efficiency of machines and stuff
- control the aberration of needs of raw-material
- depends on aberration to revise raw-material-sourcing
- qualitycontrol based on quality-assurance (inline and final inspection)

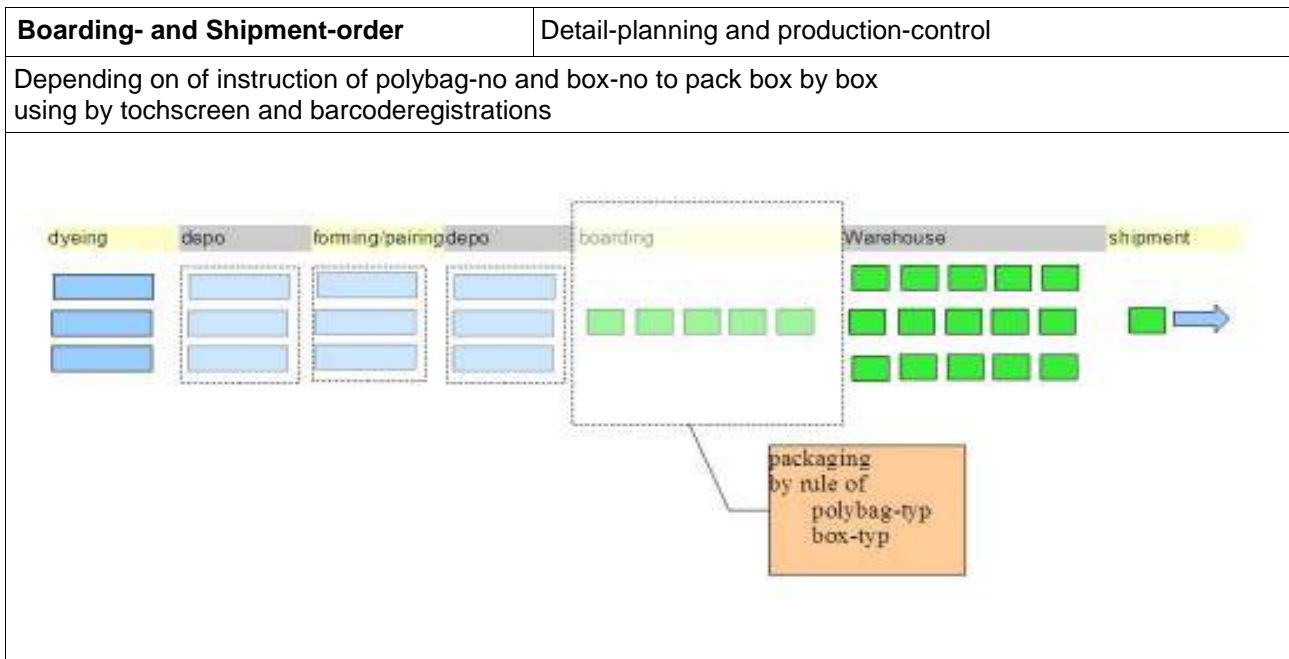
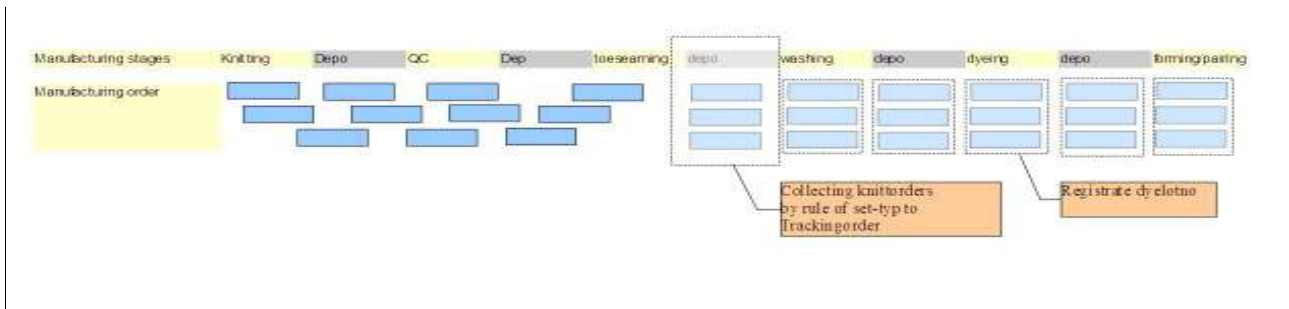
order	pid	PlanNo	QD02	Depot04E	Kont-2	Depot04E	Forma/C4	Depot04F	Palatiles	Depot05	Accotilens	Depot06	Depot07	Shipment	Sold	Depot08	2. choice	%
142-1	38/42	786					39				39	370					-422	48.96%
	43/46	810					91				153	314				45	198	30.34%
	47/50	96					125											
	38/42-43/46-4	1.692					254				192	684				45	620	37.00%
142-2	38/42	12.195					878		411			691	9.217			516	83	5.07%
	43/46	18.344					898	1.201	347		4.235	12.327				790	221	4.84%
	47/50	3.366					271				518	2.415				66	42	3.26%
	38/42-43/46-4	34.905					2.007	1.201	758		5.439	33.959				1.372	346	4.77%
142-3	38/42	3.648					285				84	1.687				96	145	7.54%
	43/46	5.124					422				1.839	845				112	261	7.88%
	47/50	625					23					387				22	12	7.68%
	38/42-43/46-4	9.397					730				1.923	3.019				230	418	7.74%
142-4	38/42	755					13		236			306				5	81	8.89%
	43/46	972					8					760				15		1.43%
	47/50																	
	38/42-43/46-4	1.757					18		236			760				20	81	5.21%



Tracking-order (synchronization) | Detail-planning and production-control

In front of washing in order by set-no the knitting-manufacturing-order are getting collectet (synchronization) to tracking-order

- rules
 - lotsize of washing
 - lotsize of dyeing
 - capacity of boarding in one shift
- advantage of synchronization
 - to avoid dyelot mix during boarding
 - to control in time to have all style-no of needs of set-no
 - to optimize the production-flow for washing, dyeing and boarding



Conclusion

socks- and tights-production are integrated in supply-chain-management. Facts like supplier's reliability, data integrity, realtime communicaton and quality-claim force the enterprises to establish information-services.

ERP(enterprise resource planning)–systems setting therefor the rudiment.

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