INTERCHAIN 2023

1. Situation

- Brief the case:

+ AB InBev is the world's largest beer company with 2 breweries in Vietnam.

+ The summer season is coming, so order quantity from Southest Asian countries has soared.

- Problems:

+ Defective orders of 32000 cases in Singapore lead to unexpected compensation.

+ Shortage of raw materials to compensate these defective orders.

+ Increasing demand with close expected arrival of time

2. Strategic Approach to the problems

- Problem 1: Increasing demand with close expected arrival of time:

+ Establish a flexible production plan to meet the demand at the right time with minimum incurred cost.

+ Calculate Latest required complete date to identify which orders should be prioritized.

Specifically:

- The order with earliest latest required complete date should be manufactured first.
- The next order will be decided on 2 criteria: earlier latest required complete date, shorter changeover time between different products.
- Objective: Minimize the number of late days.

- Problem 2: Defective orders

+ Negotiate with the distributors that we will compensate at another time (try to be as soon as possible) (which is 10/7/2023 in this case)

+ Promotion/Discounts… methods to improve the relationship with these distributors.

- Problem 3: Shortage of raw materials

+ It takes 14 days to import raw materials. We are now by the end of May and earliest order is on 10/07/2023 so we should send requests to suppliers as soon as possible.

+ However, we didn't anticipate defective orders → We can exchange raw materials with other breweries in different countries. Or find an alternative suppliers to quickly replenish the inventory.

+ The expected date of importing is 15/06/2023. In this waiting time, we should make use of our already available inventory.

3. Production plan

- Assumption: We still have some available raw materials (from inventory, safety stocks). And we'll start producing on 12/06/2023 when waiting for new orders in 15/6/2023.

- For defective order in Singapore, we will add them to the order in July using information of the same SKU. The delivery time can be 3,7 or 14. I will assume it to be 7 considering the distance from Binh Duong to Singapore:

ORDER NUMBER	SKU DESCRIPTION	SKU CODE	ETA DATE	LEADTIME PRODUCTION (DA	LEADTIME RELEASE (DAYS	EXPORT PROCESS TIME (DAYS)	LEADTIME DELIVERY (DAYS)	QUANTITY ORDER (CASES)	NOMINAL SPEED (CASE/H)	PRODUCTI ON LIN
19	BUDWEISER 610ML 1X12 OW	A	10/07/2023	3	7	4	7	32000	720	LINE A

- Formulas:

+ Leadtime Manufacturing (h) = Quantity order/Nominal speed

+ Leadtime Manufacturing (days) = Manufacturing time (h) / 24

+ Total leadtime (days) = Leadtime production + Leadtime release + Export process time + Leadtime Delivery + Leadtime Manufacturing

+ Latest required complete date (Latest date the operation has to be completed to be on time) = ETA date – Total leadtime

+ Due date = ETA date - Production start date

+ Down time = CIP&Start time + Changeover time + CIP in the final

- Production line B (Sorted by earliest "Latest required complete date")

+ Order Information:

ORDER NUMBER	SKU DESCRIPTION	ETA DATE	LEADTIME PRODUCTION (DAYS)	LEADTIME RELEASE (DAYS)	EXPORT PROCESS TIME (DAYS)	LEADTIME DELIVERY (DAYS)	QUANTITY ORDER (CASES)	NOMINAL SPEED (CASE/H)	PRODUCTION LINE	LEADTIME MANUFACTURING (HOURS)	LEADTIME MANUFACTURING (DAYS)	TOTAL LEADTIME (DAYS)	LATEST REQUIRED COMPLETE DATE	DUE DATE
6	BUDWEISER KEG	10/07/2023	3	7	4	3	15040	80	LINE B	188,00	7,83	24,83	15/06/2023	28
14	BUDWEISER KEG	25/07/2023	3	7	4	14	6000	80	LINE B	75,00	3,13	31,13	23/06/2023	43
7	BUDWEISER KEG	15/07/2023	3	7	4	3	5040	80	LINE B	63,00	2,63	19,63	25/06/2023	33
8	BUDWEISER KEG	25/07/2023	3	7	4	3	15040	80	LINE B	188,00	7,83	24,83	30/06/2023	43

+ Production plan:

WEEK	ORDER NUMBER	MANUFACTURING TIME (HOURS)	DOWN TIME	CUMMULATIVE MANUFACTURING TIME	COMPLETE DATE	LATEST REQUIRED COMPLETE DATE	NUMBER OF LATE DAYS
1	6	139	5	144	18/06/2023	15/06/2023	
OFF DATE					19/06/2023		
2	6	49	3	52	21/06/2023	15/06/2024	6
	14	75	0	127	24/06/2023	23/06/2024	1
	7	15	2	144	25/06/2023	25/06/2023	0
OFF DATE					26/06/2023		
3	7	48	3	51	28/06/2023	25/06/2023	3
	8	91	2	144	02/07/2023	30/06/2023	
OFF DATE					03/07/2023		
4	8	97	5	102	09/07/2023	30/06/2023	9
		TOTAL DOWN TIME	20			TOTAL LATE	19

TOTAL MANUFACTURING TIME (1 WEEK)	144 HOURS
CIP&START-UP TIME	3 HOURS
CIP FINAL	2 HOURS
PRODUCTION START DATE	12/06/2023

- Production line A:

+ Order information:

ORDER NUMBE	SKU DESCRIPTION	SKU CODE	ETA DATE	LEADTIME PRODUCTION (DAY	LEADTIME RELEASE (DAY	EXPORT PROCESS TIME (DAYS)	LEADTIME DELIVERY (DAY	QUANTITY ORDER (CASES)	NOMINAL SPEED (CASE/H)	PRODUCTION LINE	LEADTIME MANUFACTURING (HOURS)	LEADTIME MANUFACTURING (DAYS)	TOTAL LEADTIME (DAYS)	LATEST REQUIRED COMPLETE DA
19	BUDWEISER 610ML 1X12 OW	A	10/07/2023	3	7	4	7	32000	720	LINE A	44,44	1,85	22,85	17/06/2023
5	BUDWEISER 500ML 6X2 CAN	C	10/07/2023	3	7	4	3	120096	1200	LINE A	100,08	4,17	21,17	18/06/2023
4	BUDWEISER 500ML 1X12 BOX CAN	B	10/07/2023	3	7	4	3	52096	1200	LINE A	43,41	1,81	18,81	21/06/2023
9	BUDWEISER 355ML 1X24 ALU	D	10/07/2023	3	7	4	3	12016	450	LINE A	26,70	1,11	18,11	21/06/2023
1	BUDWEISER 610ML 1X12 OW	A	10/07/2023	3	7	4	3	10080	720	LINE A	14,00	0,58	17,58	22/06/2023
15	BUDWEISER 500ML 1X12 BOX CAN	B	25/07/2023	3	7	4	14	30024	1200	LINE A	25,02	1,04	29,04	25/06/2023
10	BUDWEISER 330ML 1X24 BOX CAN	E	15/07/2023	3	7	4	3	50040	1100	LINE A	45,49	1,90	18,90	26/06/2023
18	BUDWEISER 610ML 1X12 OW	A	25/07/2023	3	7	4	14	13360	720	LINE A	18,56	0,77	28,77	26/06/2023
16	BUDWEISER 355ML 1X24 ALU	D	15/07/2023	3	7	4	3	14716	450	LINE A	32,70	1,36	18,36	26/06/2023
3	BUDWEISER 610ML 6X2 OW	F	15/07/2023	3	7	4	3	16720	720	LINE A	23,22	0,97	17,97	27/06/2023
12	BUDWEISER 330ML 1X24 BOX CAN	E	25/07/2023	3	7	4	7	10680	1100	LINE A	9,71	0,40	21,40	03/07/2023
13	BUDWEISER 500ML 1X12 BOX CAN	B	25/07/2023	3	7	4	7	10064	1200	LINE A	8,39	0,35	21,35	03/07/2023
17	BUDWEISER 330ML 1X24 BOX CAN	E	25/07/2023	3	7	4	3	110305	1100	LINE A	100,28	4,18	21,18	03/07/2023
2	BUDWEISER 610ML 1X12 OW	A	25/07/2023	3	7	4	3	18400	720	LINE A	25,56	1,06	18,06	06/07/2023
11	BUDWEISER 610ML 6X2 OW	F	25/07/2023	3	7	4	3	11760	720	LINE A	16,33	0,68	17,68	07/07/2023

+ Production plan:

Unit (Mins) →	BUDWEISER 610ML1X12 OW	BUDWEISER 500ML1X12 BOX CAN	BUDWEISER 500ML6X2 CAN	BUDWEISER 355ML1X24 ALU	BUDWEISER 330ML1X24 BOX CAN	BUDWEISER 610ML6X2 OW
BUDWEISER 610ML1X12 OW		120	120	180	180	30
BUDWEISER 500ML1X12 BOX CAN	180		30	360	60	180
BUDWEISER 500ML6X2 CAN	180	30		360	60	180
BUDWEISER 355ML1X24 ALU	150	360	360		360	150
BUDWEISER 330ML1X24 BOX CAN	120	60	60	360		120
BUDWEISER 610ML6X2 OW	30	120	120	180	180	

WEEK	ORDER NUMBER	SKU	MANUFACTURING TIME (HOURS)	DOWN TIME	CUMMULATIVE MANUFACTURING TIME	COMPLETE DATE	LATEST REQUIRED COMPLETE DATE	NUMBER OF LATE DAYS
1	19	A	44,44	3	47,44	13/06/2023	17/06/2023	0
	1	A	14	0	61,44	16/06/2023	22/06/2023	0
	9	D	26,7	2,5	90,64	17/06/2023	21/06/2023	0
	4	B	43,41	3	137,05	18/06/2023	21/06/2023	0
	5	C	4,45	2,5	144	18/06/2023	18/06/2023	
OFF DATE						19/06/2023		
2	5	C	95,63	3,5	99,13	23/06/2024	18/06/2023	5
	15	B	25,02	0,5	124,65	24/06/2023	25/06/2023	0
	10	E	16,35	3	144	25/06/2023	26/06/2023	
OFF DATE						26/06/2023		
3	10	E	29,14	3	32,14	27/06/2023	26/06/2023	1
	18	A	18,56	2	52,7	28/06/2023	26/06/2023	2
	3	F	23,22	0,5	76,42	29/06/2023	27/06/2023	2
	16	D	32,7	3	112,12	30/06/2023	26/06/2023	4
	13	B	8,39	3	123,51	01/07/2023	03/07/2023	0
	12	E	9,71	1	134,22	01/07/2023	03/07/2023	0
	17	E	7,78	2	144	02/07/2023		
OFF DATE						03/07/2023		
4	17	E	92,5	3	95,5	06/07/2023	03/07/2023	4
	2	A	25,56	2	123,06	08/07/2023	06/07/2023	2
	11	F	16,33	2,5	141,89	08/07/2023	07/07/2024	1
			TOTAL DOWN TIME	40			TOTAL LATE DAYS	21
			DOWN TIME PORTION	7%				

- However, there are some orders with considerable late days (>=5 days). Solution:

+ Increase capacity in the next high season by upgrading manufacturing process or applying modern technologies. Although the company would lose some profits in short term, but in long term, it would be worth a change.

+ AbInbev can also contact other breweries to manufacture partly or wholly the orders

4. Risk management

- Supplier delays → Work on off date, make full use of safety stock

- Facility breakdown → Work on off date, send requests to other breweries to meet the demand

- Too many products of line A can lead to mistakes during changeover time → Quickly identify the mistakes by applying technology / Notice employees about frequent mistakes so they can ancicipate
- Unexpected defective products → Prepare safety stocks to partly compensate this order and negotiate with customers wisely to keep a good relationship with them