

Embroidery Simulator v.3.4. and Visualization of ROI Results

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Introduction

With the updated Embroidery Simulator it is now possible to calculate Return on Investment, based on equipment price, operation expenses, etc.

The spread sheet 'AMAYA vs. Conventional.xls' can be used to visualize the results to the prospect.

Languages currently Supported: Simplified Chinese, Traditional Chinese, Czech, French, German, Italian, Japanese, Portuguese, Russian and Spanish.

Please note that the Embroidery Simulator, the Excel Sheet mentioned above, and this documentation are not finalized yet. They are drafts, for review purpose only!

Embroidery Simulator Version 3.4:

User Input and Equation Explanation

User Inputs:

- Machine cost
- Profit per piece
- Profit per 1000 stitches
- Hours per day
- Days per week
- Weeks per year
- Revenue per 1000 stitches
- Hourly rate per operator
- Number of operators
- Monthly overhead
- Thread cost per 1000 meters
- Average thread consumption (meters) per 1000 stitches

Note: Typical thread consumption values can be between 2.5 and 6.0 meters depending on the design.

Return On Investment (Time) is When:

Profit = Machine Cost

Profit Crossover (Time) is When:

$(\text{Top Machine Total Profit} - \text{Top Machine Cost}) = (\text{Bottom Machine Total Profit} - \text{Bottom Machine Cost})$

Total Profit has 3 calculation methods:

- Method 1 = profit per piece (input) x number of pieces
- Method 2 = profit per 1000 stitches (input) x (total stitches / 1000)
- Method 3 = profit per 1000 stitches (calculated) x (total stitches / 1000)

Calculated Profit:

- Total Profit = total income - total expenses
- Total Income = (revenue per 1000 stitches) x (total stitches / 1000)
- Total Expenses = overhead + operator cost + thread cost

Profit Per 1000 Stitches = total profit / (total stitches / 1000)

Differences:

- Stitch Difference = (top machine total stitches) - (bottom machine total stitches)
- Piece Difference = (top machine total pieces) - (bottom machine total pieces)
- Profit Difference = (top machine total profit) - (bottom machine total profit)

Projected Profit Differences:

- Profit Difference Per Second = total profit difference / total seconds
- Daily Profit Difference = profit difference per second / seconds per day
- Weekly Profit Difference = daily profit difference / days per week
- Annual Profit Difference = weekly profit difference / weeks per year

Please note that the above can be retrieved by pushing the Equations button on the main screen of the Embroidery Simulator.

Setting General Parameters

Setup

General | Top Machine Properties | Bottom Machine Properties

Design Properties

Design Stitch Count: 8000

Number Of Colors: 3

Profit Per Piece: 0 ☐

Profit Per 1000 Stitches: 0 ☐

Use Calculated Profit Per 1000 Stitches: ☒

Time In Operation

Hours Per Day: 8

Days Per Week: 5

Weeks Per Year: 50

Expenses

Revenue Per 1000 Stitches: 0.2

Hourly Rate Per Operator: 13.2

Monthly Overhead: 500

Thread Cost Per 1000 Meters: 1.8

Average Thread (meters) Per 1000 Stitches: 4.7

Display

Show All Controls ☒

Defaults

OK Cancel Apply Help

- The three radio buttons define the basis for all calculations (Profit per Piece, or Profit per 1000 Stitches, or Use Calculated Profit Per 1000 Stitches). It is important to know that the Operating Expenses, such as Hourly Rate per Operator, Thread Cost, etc. will only get calculated if **Use Calculated Profit Per 1000 Stitches** is turned on.
- You can reset the parameters to the initial values if you press the Defaults button
- There is a new check box **Display, Show All Controls**: if unchecked most of the controls on the main page, such as profit fields disappear. This is useful for an initial sales demo to explain the principle, to catch the attention of a prospect.

Setting Top Machine Properties

Setup

General | **Top Machine Properties** | Bottom Machine Properties

Machine Definition

Machine Type: Amaya Flex

Machine Cost: 50495

Number of Operators: 1

Number of Heads: 6

Average Sewing Speed: 1050 spm

Event Frequencies

Thread Break: 50000 Stitches

Bobbin Break: 500000 Stitches

Maintenance: 500000 Stitches

Cone Change: 1000000 Stitches

Bobbin Change: 25000 Stitches

Event Delays

Thread Break: 45 Seconds

Bobbin Break: 45 Seconds

Cone Change: 60 Seconds

Bobbin Change: 30 Seconds

Hoop Change: 30 Seconds

Maintenance: 180 Seconds

Color Change: 5 Seconds

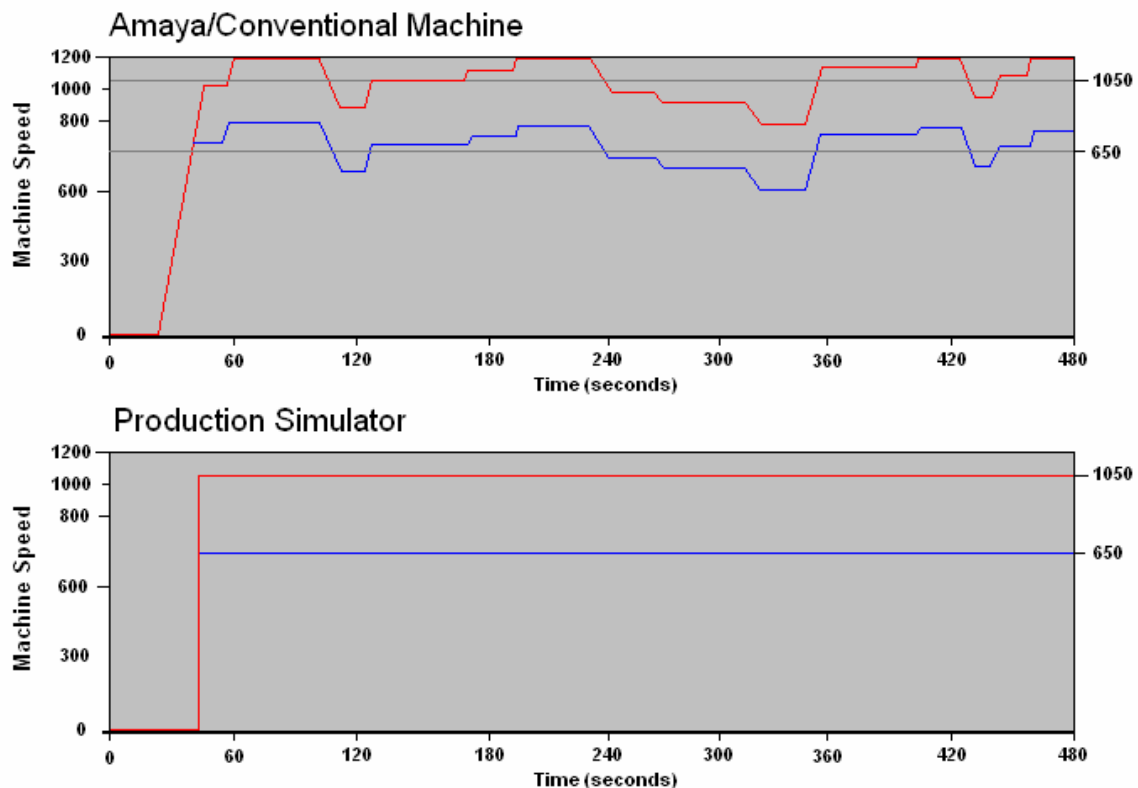
Defaults

OK Cancel Apply Help

- In order to get the profit difference results to show as a positive number it is recommended to set the AMAYA system as the TOP MACHINE.
- Please note that you can now set the number of operators [a table of recommendations, based on applications, stitch count, etc., will follow].
- Of particular interest is the setting of the speed (see following page)

Setting the speed for both AMAYA and Conventional systems:

- If you set the max speed on a machine it will limit the speed to that number, however, if there are long stitches, the speed will drop below the maximum – on both the AMAYA system and on any conventional machine (see illustration below).
- As a good rule of thumb please set the average speed that is used for calculating the production to 150spm below the set max speed.
- Sample:
 - AMAYA max. speed set to 1,200 spm results in an average of 1,050spm
 - Conventional max. speed set to 800 spm results in average of 650 spm



Setting Bottom Machine Properties

Setup

General | Top Machine Properties | Bottom Machine Properties

Machine Definition

Machine Type: Conventional

Machine Cost: 42000

Number of Operators: 1

Number of Heads: 6

Average Sewing Speed: 650 spm

Event Frequencies

Thread Break: 50000 Stitches

Cone Change: 1000000 Stitches

Bobbin Break: 500000 Stitches

Bobbin Change: 25000 Stitches

Maintenance: 500000 Stitches

Event Delays

Thread Break: 45 Seconds

Hoop Change: 30 Seconds

Bobbin Break: 45 Seconds

Maintenance: 180 Seconds

Cone Change: 60 Seconds

Color Change: 5 Seconds

Bobbin Change: 30 Seconds

Defaults

OK Cancel Apply Help

- In order to get the profit difference results to show as a positive number it is recommended to set the Conventional system as the Bottom MACHINE.
- Please note that you can now set the number of operators [a table of recommendations, based on applications, stitch count, etc., will follow].
- Remark: the Thread Break Interval on a conventional multi-head machine defines the intervals per individual head

Main Screen

Embroidery Simulator v.3.3

Top Machine - Amaya Flex 6 Head - 50,495

Run	Run	Run	Run	Run	Run
1	2	3	4	5	6
757	2638	6061	4558	5533	3078

Total Stitches: 31982625 Total Pieces: 3995 Profit/1000 St.: 0.1409 Total Profit: 4,505 Operator Count: 1 56.3 %

Bottom Machine - Conventional 6 Head - 42,000

Run	Run	Run	Run	Run	Run
1	2	3	4	5	6
5737	5737	5737	5737	5737	5737

Total Stitches: 16402422 Total Pieces: 2046 Profit/1000 St.: 0.0927 Total Profit: 1,521 Operator Count: 1 13.1 %

Stitch Diff: 15580203 Piece Diff: 1949 Profit Diff: 2,984 Elapsed Time: 100:03:02

Projected Profit Difference (Top - Bottom)

Day: 239 Month: 4,971 Year: 59,652

Time Multiplier: 10

Buttons: Run, Pause, Reset, Setup..., +1 Day, +1 Week, +1 Month, +1 Year, Crossover..., ROI..., Equations..., Print..., Help..., Exit

☒ Sound:

General:

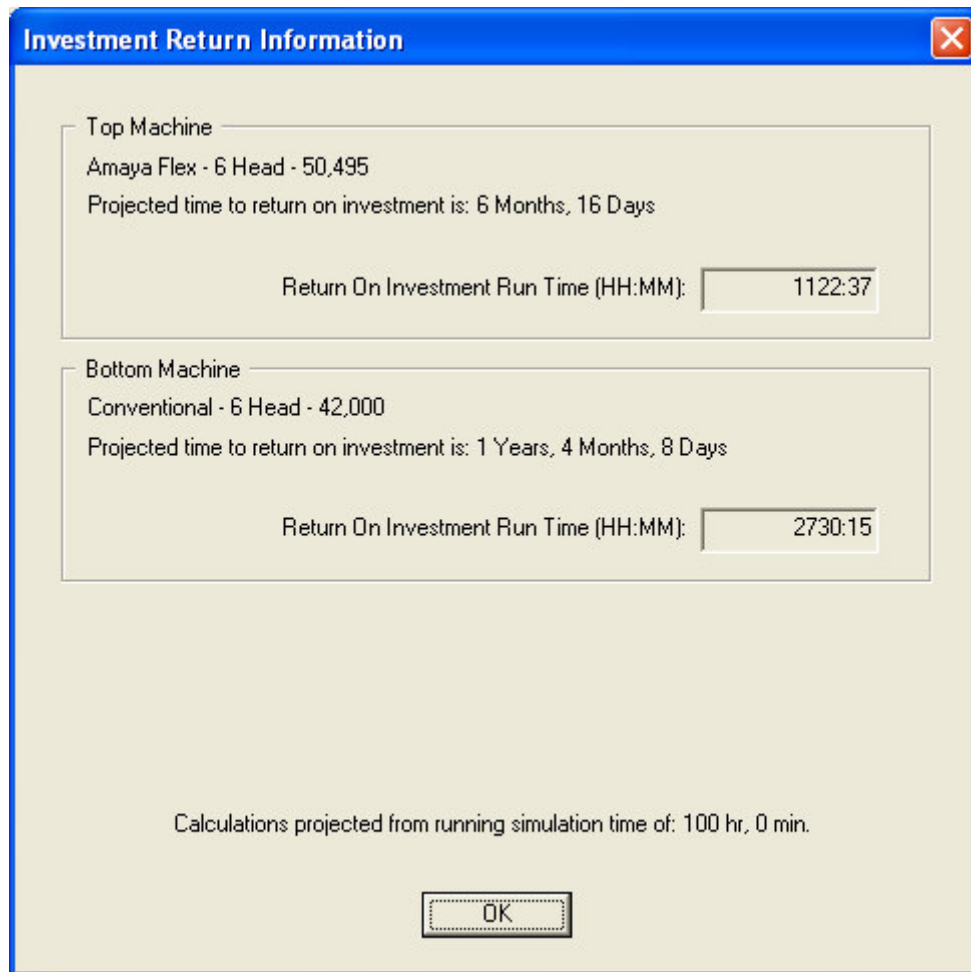
- Buttons like Setup, Reset, Pause, and Run work like they did in previous versions.
- Display fields for Stitches, Profit, etc. are the same.

New:

- **Time Accelerators buttons:** +1 Day, + 1 Week, + 1 Month, + 1 Year
- **ROI (Return on Investment)**
- **Crossover:** calculates the point when AMAYA system produces more profit than Conventional system (is 0 if AMAYA system is less expensive; is a positive number if initial purchase of AMAYA system is more expensive than Conventional system but out-produces the conventional system)
- **Printing of Results:** pushing the Print button results in printing:
 - a.) a snapshot of the current status of the production simulation
 - b.) if ROI button was pushed the ROI info for both systems
 - c.) if Crossover button was pushed the Crossover information
- Display of **Number of Operators** with average **Utilization** (e.g. a utilization of 60% means that the operator(s) are busy 60 % of the time on the machines).

Displaying ROI information

Press ROI button to get to the following screen:



The dialog box titled "Investment Return Information" displays ROI data for two machine types. It includes a close button (X) in the top right corner. The "Top Machine" section shows "Amaya Flex - 6 Head - 50,495" with a projected return time of "6 Months, 16 Days" and a run time of "1122:37". The "Bottom Machine" section shows "Conventional - 6 Head - 42,000" with a projected return time of "1 Years, 4 Months, 8 Days" and a run time of "2730:15". A note at the bottom states "Calculations projected from running simulation time of: 100 hr, 0 min." and an "OK" button is at the bottom center.

Machine Type	Model	Price	Projected time to return on investment	Return On Investment Run Time (HH:MM)
Top Machine	Amaya Flex - 6 Head	50,495	6 Months, 16 Days	1122:37
Bottom Machine	Conventional - 6 Head	42,000	1 Years, 4 Months, 8 Days	2730:15

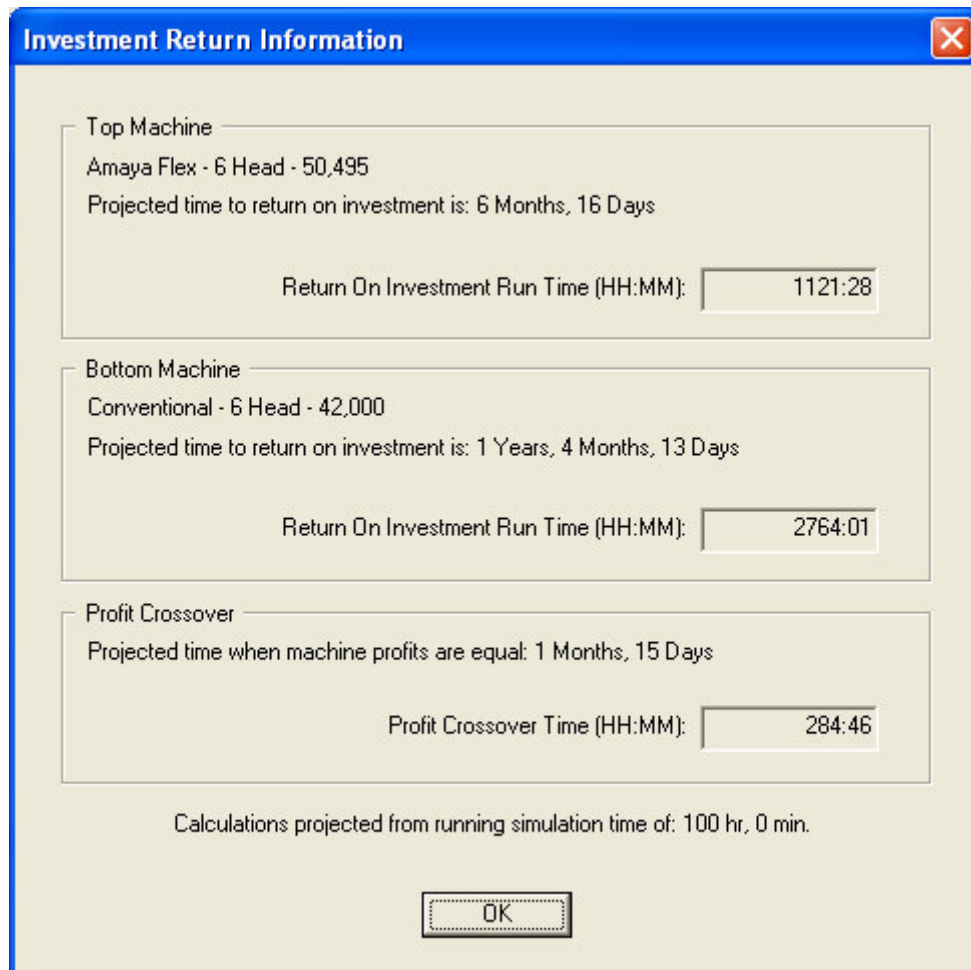
Calculations projected from running simulation time of: 100 hr, 0 min.

OK

- Please use this information (ROI time) for entering into spread sheet 'AMAYA vs. Conventional.xls'.
- Note: the ROI information can be printed by pushing the Print button after exiting this screen.

Displaying Crossover Information

Press Crossover button to get to the following screen:



The dialog box titled "Investment Return Information" displays the following data:

Machine Type	Model	Price	Projected time to return on investment	Return On Investment Run Time (HH:MM)
Top Machine	Amaya Flex	6 Head - 50,495	6 Months, 16 Days	1121:28
Bottom Machine	Conventional	6 Head - 42,000	1 Years, 4 Months, 13 Days	2764:01

Profit Crossover

Projected time when machine profits are equal: 1 Months, 15 Days

Profit Crossover Time (HH:MM): 284:46

Calculations projected from running simulation time of: 100 hr, 0 min.

OK

- ROI information gets displayed again
- Crossover time is ...
 - ... zero (0) if AMAYA system is less expensive;
 - ... is a positive number if initial purchase of AMAYA system is more expensive than Conventional system but out-produces the conventional system.

Visualizing of ROI Results

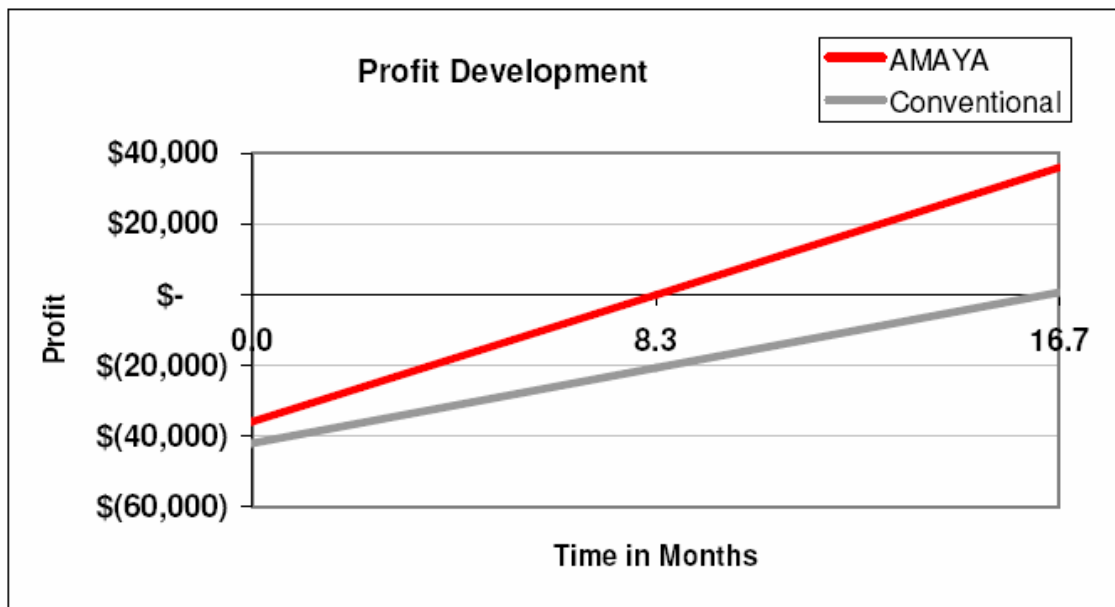
Steps:

1. Open up spread sheet
2. Enter Data, based on the Embroidery Simulator run, as following:
 - a. Head Numbers
 - b. System Prices
 - c. ROI numbers (split in years, months, and days)
3. Print Result

Samples USA

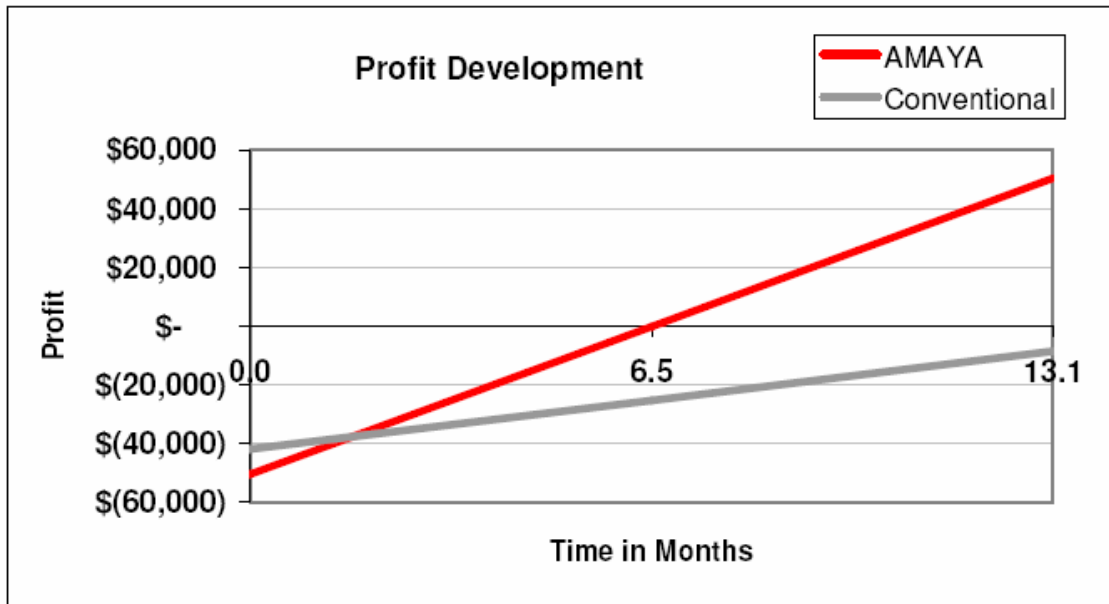
Result:

	No. of Heads	System Price	ROI Years	ROI Months	ROI Days
AMAYA System	4	\$ 35,995		8	10
Conventional	6	\$ 42,000		16	13



Print of Alternative Sample:

	No. of Heads	System Price	ROI Years	ROI Months	ROI Days
AMAYA System	6	\$ 50,495		6	16
Conventional	6	\$ 42,000		16	13



Investment Return Information ✕

Top Machine
Amaya Flex - 6 Head - 50,495
Projected time to return on investment is: 6 Months, 16 Days

Return On Investment Run Time (HH:MM): 1121:28

Bottom Machine
Conventional - 6 Head - 42,000
Projected time to return on investment is: 1 Years, 4 Months, 13 Days

Return On Investment Run Time (HH:MM): 2764:01

Profit Crossover
Projected time when machine profits are equal: 1 Months, 15 Days

Profit Crossover Time (HH:MM): 284:46

Calculations projected from running simulation time of: 100 hr, 0 min.

OK

Sample China

6HD Tajima, assembled in China, vs. 6HD AMAYA.

General Parameters (all numbers in US\$):

Setup

General | Top Machine Properties | Bottom Machine Properties

Design Properties

Design Stitch Count: 8000

Number Of Colors: 3

Profit Per Piece: 0

Profit Per 1000 Stitches: 0

Use Calculated Profit Per 1000 Stitches: ☒

Time In Operation

Hours Per Day: 24

Days Per Week: 7

Weeks Per Year: 50

Expenses

Revenue Per 1000 Stitches: 0.036

Hourly Rate Per Operator: 1.14

Monthly Overhead: 100

Thread Cost Per 1000 Meters: 0.73

Average Thread (meters) Per 1000 Stitches: 4.7

Display

Show All Controls ☒

Defaults

OK Cancel Apply Help

AMAYA 6HD, max. speed set to 1,200 spm, average around 1,050:

The screenshot shows the 'Setup' dialog box with the 'General' tab selected. The 'Machine Definition' section has 'Machine Type' set to 'Amaya Flex', 'Machine Cost' at 50495, 'Number of Operators' at 1, 'Number of Heads' at 6, and 'Average Sewing Speed' at 1050 spm. The 'Event Frequencies' section lists: Thread Break (50000 Stitches), Cone Change (1000000 Stitches), Bobbin Break (500000 Stitches), Bobbin Change (25000 Stitches), and Maintenance (500000 Stitches). The 'Event Delays' section lists: Thread Break (45 Seconds), Hoop Change (30 Seconds), Bobbin Break (45 Seconds), Maintenance (180 Seconds), Cone Change (60 Seconds), Color Change (5 Seconds), and Bobbin Change (30 Seconds). A 'Defaults' button is at the bottom right of the settings area. At the very bottom are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Machine Definition	
Machine Type:	Amaya Flex
Machine Cost:	50495
Number of Operators:	1
Number of Heads:	6
Average Sewing Speed:	1050 spm

Event Frequencies	
Thread Break:	50000 Stitches
Cone Change:	1000000 Stitches
Bobbin Break:	500000 Stitches
Bobbin Change:	25000 Stitches
Maintenance:	500000 Stitches

Event Delays	
Thread Break:	45 Seconds
Hoop Change:	30 Seconds
Bobbin Break:	45 Seconds
Maintenance:	180 Seconds
Cone Change:	60 Seconds
Color Change:	5 Seconds
Bobbin Change:	30 Seconds

Tajima 6HD, max. speed set to 900 spm, average around 750:

The screenshot shows the 'Setup' dialog box with the 'General' tab selected. The 'Machine Definition' section has 'Machine Type' set to 'Conventional', 'Machine Cost' at 25455, 'Number of Operators' at 1, 'Number of Heads' at 6, and 'Average Sewing Speed' at 850 spm. The 'Event Frequencies' section lists: Thread Break (50000 Stitches), Cone Change (1000000 Stitches), Bobbin Break (500000 Stitches), Bobbin Change (25000 Stitches), and Maintenance (500000 Stitches). The 'Event Delays' section lists: Thread Break (45 Seconds), Hoop Change (30 Seconds), Bobbin Break (45 Seconds), Maintenance (180 Seconds), Cone Change (60 Seconds), Color Change (5 Seconds), and Bobbin Change (30 Seconds). A 'Defaults' button is at the bottom right of the settings area. At the very bottom are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Machine Definition	
Machine Type:	Conventional
Machine Cost:	25455
Number of Operators:	1
Number of Heads:	6
Average Sewing Speed:	850 spm

Event Frequencies	
Thread Break:	50000 Stitches
Cone Change:	1000000 Stitches
Bobbin Break:	500000 Stitches
Bobbin Change:	25000 Stitches
Maintenance:	500000 Stitches

Event Delays	
Thread Break:	45 Seconds
Hoop Change:	30 Seconds
Bobbin Break:	45 Seconds
Maintenance:	180 Seconds
Cone Change:	60 Seconds
Color Change:	5 Seconds
Bobbin Change:	30 Seconds

Embroidery Simulator v.3.4

Top Machine - Amaya Flex 6 Head - 50,495

Run	Run	Run	Run	Run	Run
1	2	3	4	5	6
6606	666	3521	4480	6606	2241

Total Stitches: 31864120 Total Pieces: 3980 Profit/1000 St: 0.0285 Total Profit: 909.59 Operator Count: 1 56.3 %

Bottom Machine - Conventional 6 Head - 25,455

Run	Run	Run	Run	Run	Run
1	2	3	4	5	6
1148	1148	1148	1148	1148	1148

Total Stitches: 18054888 Total Pieces: 2256 Profit/1000 St: 0.0255 Total Profit: 459.75 Operator Count: 1 14.4 %

Stitch Diff: 13809232 Piece Diff: 1724 Profit Diff: 449.84 Elapsed Time: 100:00:00

Projected Profit Difference (Top - Bottom)

Day: 108 Month: 3,149 Year: 37,787

Time Multiplier: 10

Run Pause Reset Setup... +1 Day +1 Week +1 Month +1 Year Crossover... ROI... Equations... Print... Help... Exit

☒ Sound

Investment Return Information

Top Machine
Amaya Flex - 6 Head - 50,495
Projected time to return on investment is: 7 Months, 28 Days

Return On Investment Run Time (HH:MM): 5551:25

Bottom Machine
Conventional - 6 Head - 25,455
Projected time to return on investment is: 7 Months, 27 Days

Return On Investment Run Time (HH:MM): 5536:45

Calculations projected from running simulation time of: 100 hr, 0 min.

OK

Interestingly enough ROI is almost the same for both machines, however, AMAYA will generate much more revenue on a going forward basis!

	No. of Heads	System Price	ROI Years	ROI Months	ROI Days
AMAYA System	6	\$ 50,495		7	28
Conventional	6	\$ 25,455		7	27

