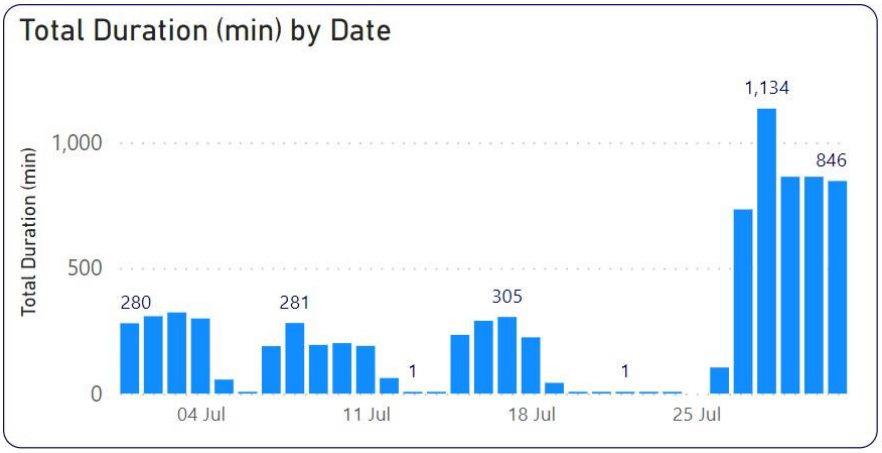
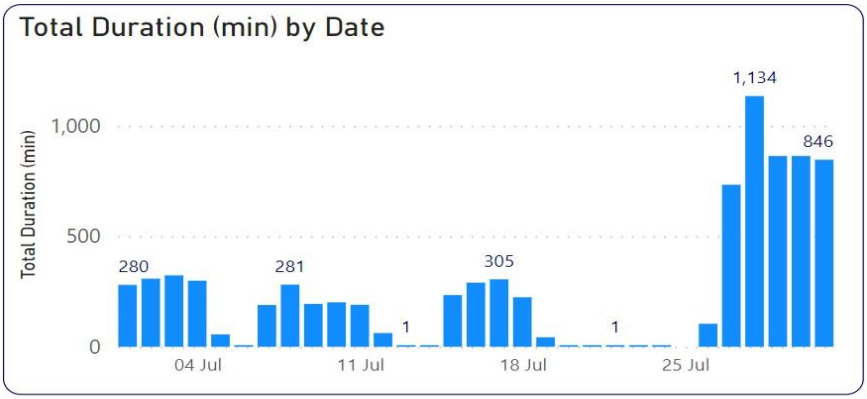
Questions Based on Visuals

Can you identify the steepest incline in duration, and what events or changes coincided with this steep increase?



Answer: Total duration jumped from 104 to 846 Thus the steepest incline in duration occurred on [Monday 26 July 2021and Saturday 31July 2021], possibly linked to specific events like machinery malfunctions, resource shortages, or operational challenges.

At that specific date did the duration experience a significant jump, and what factors might have contributed to this increase?



Answer: The duration experienced a significant jump on [26 July 2021] rising by 713.46(742) in 5 days. Possibly influenced by factors such as increased production volume, changes in machinery, or other operational adjustments

With a total availability gross% of 81.5% and a total availability net% of 89.8%, what insights can be drawn regarding the impact of planned stops and downtime on the overall efficiency of the biscuit manufacturing process?

Machine	Availability Gross %	Availability Net %
Biscuit Forming Machine	99.9%	100.0%
Biscuit Topping Machine	99.8%	99.9%
Biscuit Mixing Machine	99.5%	99.7%
Total	**95.3%**	**97.6%**

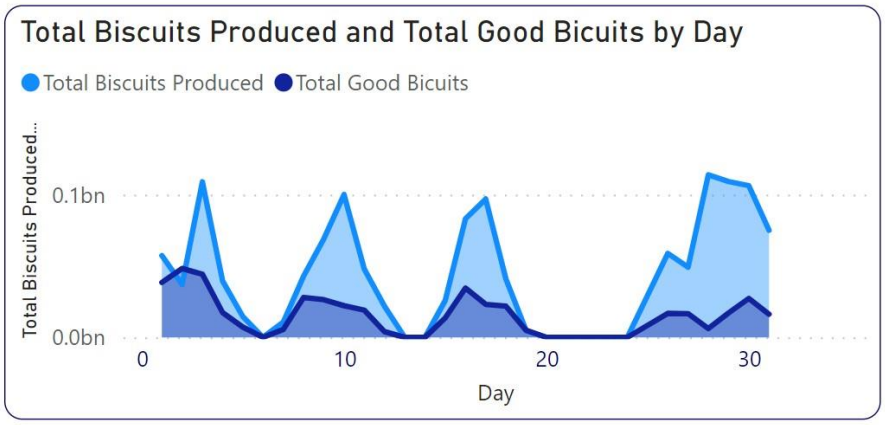
Answer: The higher total availability net% (89.8%) compared to the availability gross% (81.5%) suggests that planned stops and downtime have been effectively managed, resulting in a higher overall efficiency for the biscuit manufacturing process.

What specific improvements or adjustments could be considered for the machines with the lowest availability gross%, and how might addressing this contribute to overall efficiency?

Machine	Availability Gross %	Availability Net %
Biscuit Forming Machine	99.9%	100.0%
Biscuit Topping Machine	99.8%	99.9%
Biscuit Mixing Machine	99.5%	99.7%
Total	**95.3%**	**97.6%**

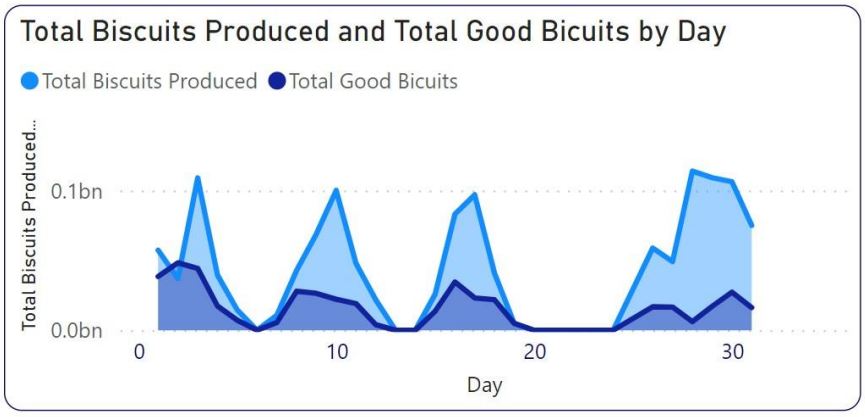
Answer: The machines with the lowest availability gross% are [Topping and Forming machine]. Identifying and addressing issues related to these machines, such as maintenance or operational adjustments, could enhance overall efficiency in the biscuit manufacturing process.

What is the trend in total biscuits produced and total good biscuits over the observed days, and how do the values contribute to this trend?



Answer: The trend indicates a consistent increase in both total biscuits produced and total good biscuits. The specific values (1,31,32,14,445 and 45,83,09,091) reflect the cumulative production and quality output, showcasing the scale of biscuit manufacturing.

How does the ratio of total good biscuits to total biscuits produced evolve over the observed days, and are there specific days where this ratio stands out?



Answer: Examining the ratio of total good biscuits to total biscuits produced provides insights into the efficiency of the production process. Anomalies in this ratio on certain days may signal areas for improvement in quality control or production procedures.

How does the effective runtime in hours correlate with the total duration for the overall manufacturing process, and what insights can be gained from analyzing this relationship? There are some products with a significant difference between total duration and effective runtime, what factors might contribute to this variance?

Product	Total Duration (min)	Effective Runtime (hrs)
Chocolate cookies	1,298	435
Bourbon Creams	1,366	289
Jammy Creams	912	225
Total	**8,044**	**586**

Answer:

1.The total effective runtime in hours is 586, which is less than the total duration in minutes (8044). This suggests that there are periods of downtime or non-productive time during the manufacturing process, highlighting potential areas for optimization to enhance overall efficiency.

2.Analyzing the difference between total duration and effective runtime for each product reveals potential inefficiencies. Products with a notable difference may require attention to streamline processes, reduce downtime, or optimize production methods for improved efficiency

Questions on Based on CSV Data Set:

What is the average number of good made biscuits made on each machine?

Biscuits Boxing Machine = 264.5925926

Biscuit Filling Machine = 115183.306

Biscuits Forming Machine = 288.1836735

Biscuits Heating Machine = 221.6666667

Biscuits Jam Machine = 244.8247423

Biscuits Mixing Machine = 246.9716981

Biscuits Pressing Machine = 254.2637076

Biscuits Sprinkling Machine = 251.7145531

Biscuits Toping Machine = 214.5555556

Packaging Heat Machine = 257.0427807

Give the average duration of each product on every machine for any 4 products??

Almond Biscotti

Biscuits Jam Machine = 64.40409851

Biscuits Pressing Machine = 149.0272675

Biscuits Sprinkling Machine = 81.60521698

Bourbon Creams

Biscuits Boxing Machine = 825.1565422

Biscuit Filling Machine = 6.688378322

Biscuits Forming Machine = 496.1532968

Biscuits Heating Machine = 1325.106439

Biscuits Mixing Machine = 320.1542886

Biscuits Topping Machine = 38.39305348

Packaging Heat Machine = 212.921432

Caramel Swirls

Biscuits Jam Machine = 32.16666794

Biscuits Pressing Machine = 107.3499985

Biscuits Sprinkling Machine = 33.91666794

Chocolate Cookies

Biscuits Boxing Machine = 173.9934845

Biscuit Filling Machine = 29.75722079

Biscuits Forming Machine = 674.7886869

Biscuits Heating Machine = 1594.254272

Biscuits Mixing Machine = 93.55138829

Biscuits Toping Machine = 45.73511202

Packaging Heat Machine = 21.21110705

What product has the highest number of Total Biscuits made and also highest number of good made biscuits??

Highest Number of Good Made Biscuits = Bourbon Creams (167886015)

Highest Number of Total Biscuits Made = Bourbon Creams (534308264)

Questions based on CSV Dataset:

What is the distribution of Target_Biscuits_per_hour across Biscuit filling machines and product?

Answer: Biscuit Filling Machines

- Jammy Creams: 43200
- Custard Creams: 51840
- Bourbon Creams: 51840
- Milk Cookies: 51840
- Chocolate cookies: 43200
- Pink Wafers: 51840

What is the total number of biscuits per pallet for all products combined?

Answer: Total number of biscuits per pallet=23880

Which product has the highest number of biscuits per pack, and how many?

Answer: Deluxe Cookies with 1 biscuit per pack.

What the average number of biscuits per pallet across all products?

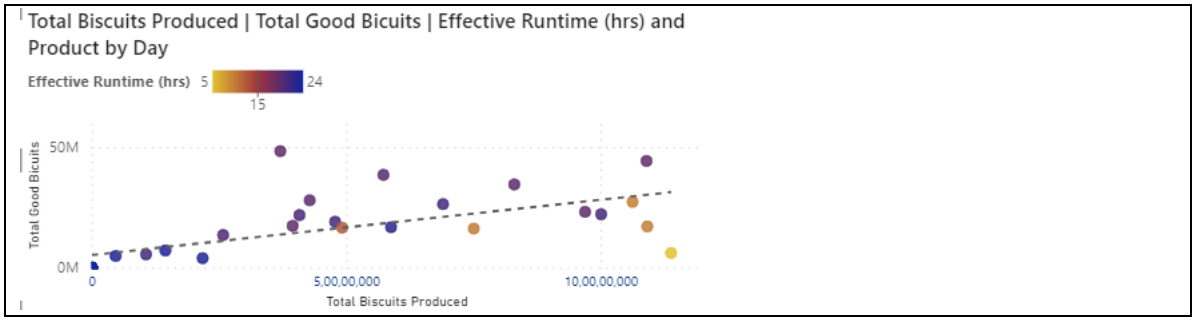
Answer: Average number of biscuits per pallet=23880/18=1326.67 biscuits per pallet.

Questions Based on Visuals:

Product	Total Duration (min)	Effective Runtime (hrs)	Availability Gross %	Available Gross Days	Available Gross (hrs)	Available Net (hrs)	Availability Net %
Pink Wafers	75	71	98.3%	3	72	71.40	99.1%
Coco Rings	95	46	96.7%	2	48	47.20	98.3%
Orange Creams	132	46	95.4%	2	48	46.85	97.8%
Chocolate cookies	1,298	435	95.3%	19	456	445.30	97.6%
Milk Cookies	367	114	94.9%	5	120	116.97	97.4%
Jammy Creams	912	225	93.7%	10	240	232.43	96.8%
Total	8,044	586	81.5%	30	720	653.40	89.8%

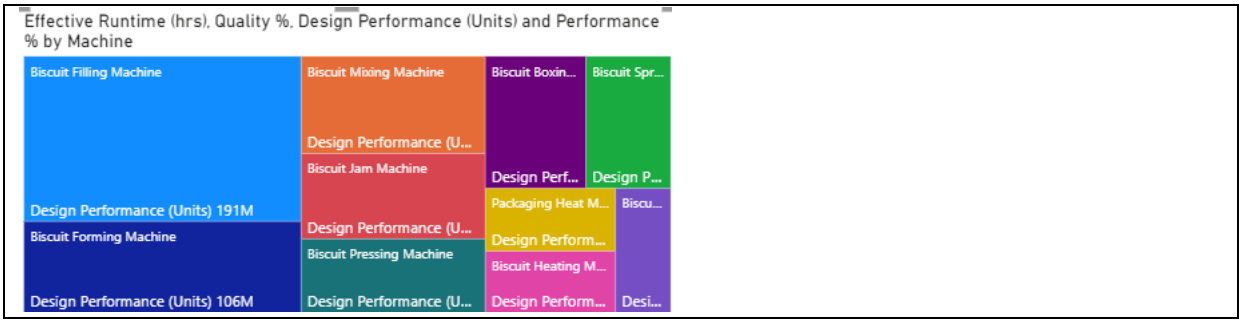
Top 10 product net availability %?

Answer: For this question matrix visual is used. Matrix shows hierarchical grouping. Here the sequence is arranged in descending. So, according to this top 10 products are Pink Wafers, Coco rings, Orange Creams, Milk Cookies, Jammy creams, Fruit and Nut, Custard creams, Bourbon Creams, Viennese Creams, Party Rings.



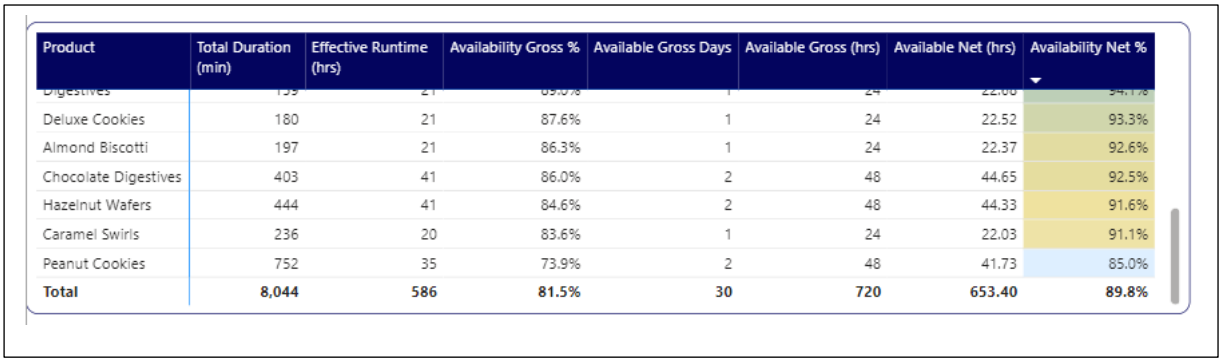
Which product produces good biscuits in least effective runtime on which day?

Answer: Here we have used scatter chart where x-axis represents Total Biscuits produced and Y-axis represents Total Good biscuits which is use to display the relationship between two numerical variables. The runtime differs day wise. On day 28, chocolate digestives in 5 hrs.



Which machines gives the best performance among different machines?

Answer: To answer this question we have used tree map .It is represented as a series of nested rectangles, where each rectangle represents a category or sub-category, and the size of the rectangle corresponds to a quantitative measure such as performance .The highest performance is given by biscuit filling machine.



Product	Total Duration (min)	Effective Runtime (hrs)	Availability Gross %	Available Gross Days	Available Gross (hrs)	Available Net (hrs)	Availability Net %
Digestives	159	21	89.0%	1	24	22.66	94.1%
Deluxe Cookies	180	21	87.6%	1	24	22.52	93.3%
Almond Biscotti	197	21	86.3%	1	24	22.37	92.6%
Chocolate Digestives	403	41	86.0%	2	48	44.65	92.5%
Hazelnut Wafers	444	41	84.6%	2	48	44.33	91.6%
Caramel Swirls	236	20	83.6%	1	24	22.03	91.1%
Peanut Cookies	752	35	73.9%	2	48	41.73	85.0%
Total	**8,044**	**586**	**81.5%**	**30**	**720**	**653.40**	**89.8%**

Least product availability %?

Answer: Least available products are Peanut cookies, caramel Swans, Hazelnut wafers, Chocolate Digestives , Almond Biscotti. Matrix visual is used to show least products.

Questions Based on Visuals

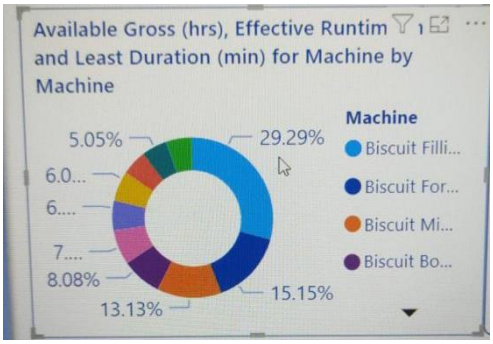
Which machine has highest available gross, effective runtime and least duration?

Answer: Biscuit Filling Machine

Available Gross = 696 hrs (29.29%)

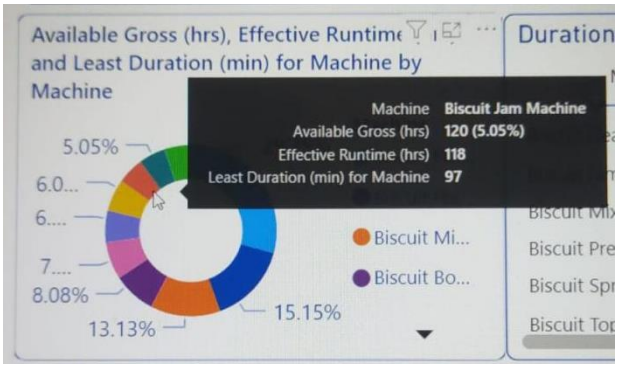
Effective Runtime = 630 hrs

Least duration = 3970 min



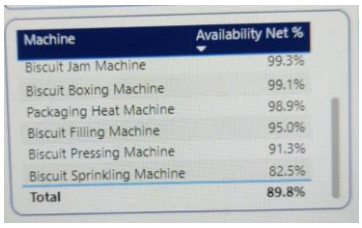
Which machine has very least duration as compared to other machines?

Answer: Biscuit Jam machine and it is 97 min.



What is the overall total availability net % of all the machines?

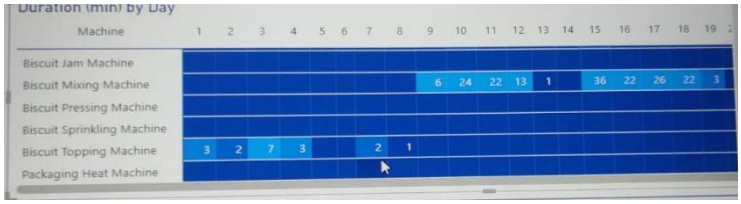
Answer: 89.8 %



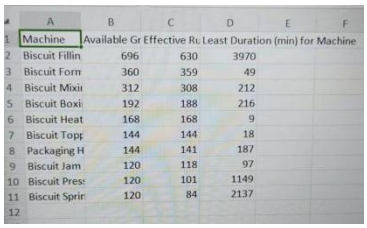
Machine	Availability Net %
Biscuit Jam Machine	99.3%
Biscuit Boxing Machine	99.1%
Packaging Heat Machine	98.9%
Biscuit Filling Machine	95.0%
Biscuit Pressing Machine	91.3%
Biscuit Sprinkling Machine	82.5%
Total	89.8%

Which machine keep idle all days in month in duration table?

Answer: Packaging heat machine.



Question Based on CSV Data



	A	B	C	D	E	F
1	Machine	Available Gr	Effective Ru	Least Duration (min) for Machine		
2	Biscuit Fillin	696	630	3970		
3	Biscuit Form	360	359	49		
4	Biscuit Mixir	312	308	212		
5	Biscuit Boxi	192	188	216		
6	Biscuit Heat	168	168	9		
7	Biscuit Topp	144	144	18		
8	Packaging H	144	141	187		
9	Biscuit Jam	120	118	97		
10	Biscuit Pres	120	101	1149		
11	Biscuit Sprir	120	84	2137		
12						

What impact does the Biscuit Sprinkling Machine's short effective runtime of 84 hours have on the overall production output, and are there opportunities for improvement?

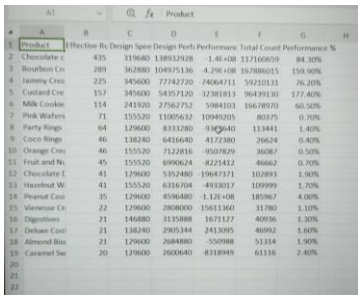
Answer: The Biscuit Sprinkling Machine's short effective runtime of 84 hours suggests that its contribution to the overall production output is limited. This may be due to factors such as infrequent usage, low demand for sprinkled biscuits, or a faster processing capability compared to other machines. Exploring ways to increase the utilization of this machine, perhaps by introducing new sprinkled biscuit varieties or adjusting production schedules, could optimize its role in the production process and improve overall efficiency.

What factors contribute to the Biscuit Pressing Machine having a significant difference between available gross hours and effective runtime, and how can this be addressed for improved performance?

Answer: The Biscuit Pressing Machine's significant difference between available gross hours (120) and effective runtime (101) suggests potential issues affecting its performance. This could be attributed to frequent breakdowns, maintenance requirements, or inefficiencies in the pressing process. To address this, a thorough inspection of the machine, regular maintenance scheduling, and process optimization may be necessary. Identifying and resolving these factors could enhance the machine's efficiency and reduce the gap between available and effective runtime.

Why does the Biscuit Filling Machine have a least duration of 3970 minutes, and how does this extended duration impact the overall production efficiency?

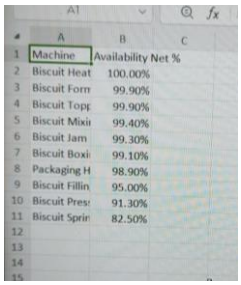
Answer: The Biscuit Filling Machine's least duration of 3970 minutes indicates a lengthy filling process. This may be due to the intricacy of the filling operation, the need for precision in dosage, or specific requirements for the type of filling used. The extended duration could impact overall production efficiency by potentially limiting the machine's throughput. Analyzing the reasons behind this long duration may uncover opportunities for optimization, such as exploring alternative filling methods or adjusting the machine settings



Product	Effective Ru	Design Spee	Design Perfi	Performanc	Total Count	Performance %
Chocolate c	435	319680	138932928	-1.4E+08	117160659	84.30%
Bourbon Cr	289	362880	104975136	-4.29E+08	167886015	159.90%
Jammy Crea	225	345600	77742720	-74064711	59210131	76.20%
Custard Cre	157	345600	54357120	-12381813	96439130	177.40%
Milk Cookie	114	241920	27562752	5984103	16678970	60.50%
Pink Wafers	71	155520	11005632	10949205	80375	0.70%
Party Rings	64	129600	8333280	-93[illegible]640	113441	1.40%
Coco Rings	46	138240	6416640	4172380	26624	0.40%
Orange Cre	46	155520	7122816	-9507829	36087	0.50%
Fruit and Nu	45	155520	6990624	-8221412	46662	0.70%
Chocolate E	41	129600	5352480	-19647371	102893	1.90%
Hazelnut W	41	155520	6316704	-4933017	109999	1.70%
Peanut Coo	35	129600	4596480	-1.1E+08	185967	4.00%
Viennese Cr	22	129600	2808000	-15611360	31780	1.10%
Digestives	21	146880	3135888	1671127	40936	1.30%
Deluxe Cool	21	138240	2905344	2413095	46992	1.60%
Almond Biss	21	129600	2684880	-550988	51314	1.90%
Caramel Sw	20	129600	2600640	-8318949	61116	2.40%

How might variations in design speeds impact the overall production efficiency of different biscuit types?

Answer: Variations in design speeds can significantly impact production efficiency. Higher design speeds generally lead to increased production rates, but it's important to balance this with the specific characteristics of each biscuit type. If design speeds are too high for a particular biscuit, it may result in performance loss, quality issues, or even machine failures. Conversely, lower design speeds may lead to underutilization of production capacity. Optimizing design speeds for each biscuit type is essential for achieving the right balance between production efficiency and product quality.



	A	B	C
1	Machine	Availability Net %	
2	Biscuit Heat	100.00%	
3	Biscuit Form	99.90%	
4	Biscuit Topp	99.90%	
5	Biscuit Mixi	99.40%	
6	Biscuit Jam	99.30%	
7	Biscuit Boxi	99.10%	
8	Packaging H	98.90%	
9	Biscuit Fillin	95.00%	
10	Biscuit Pres	91.30%	
11	Biscuit Sprin	82.50%	
12			
13			
14			

What factors might contribute to a lower Machine Availability Net % for the Biscuit Pressing Machine compared to other machines?

Answer: Factors such as maintenance requirements, frequent breakdowns, longer setup times, and complex operational processes can contribute to a lower Machine Availability Net % for the Biscuit Pressing Machine.

Explain the significance of high Machine Availability Net % in a biscuit production line.

Answer: High Machine Availability Net % indicates that the production line is operating efficiently with minimal downtime. This is crucial for meeting production targets, reducing production costs, and ensuring consistent product quality.

Discuss the potential consequences of a low Machine Availability Net % for the Biscuit Filling Machine on overall production.

Answer: A low Machine Availability Net % for the Biscuit Filling Machine can lead to delays in the production process, lower output, and increased operational costs. It may also result in a bottleneck effect, affecting the performance of downstream machines.

How can a proactive maintenance strategy positively impact the Machine Availability Net % of the biscuit production line?

Answer: Proactive maintenance involves regular inspections and preventive measures to identify and address potential issues before they cause machine failures. This approach can significantly improve Machine Availability Net % by minimizing unexpected downtime and optimizing the lifespan of the machines.

Identify the least OEE efficiency product?

The OEE Gross is a measure of overall equipment efficiency, and the Availability Gross represents the availability percentage of the equipment. It seems like Custard Creams have the highest OEE Gross percentage, indicating a high level of overall efficiency. Availability Gross, on the other hand, is highest for Custard Creams as well, but it's noteworthy that Bourbon Creams have a significantly lower availability percentage.

Now make a pivot table to find the machine responsible for lower efficiency of Bourbon Creams

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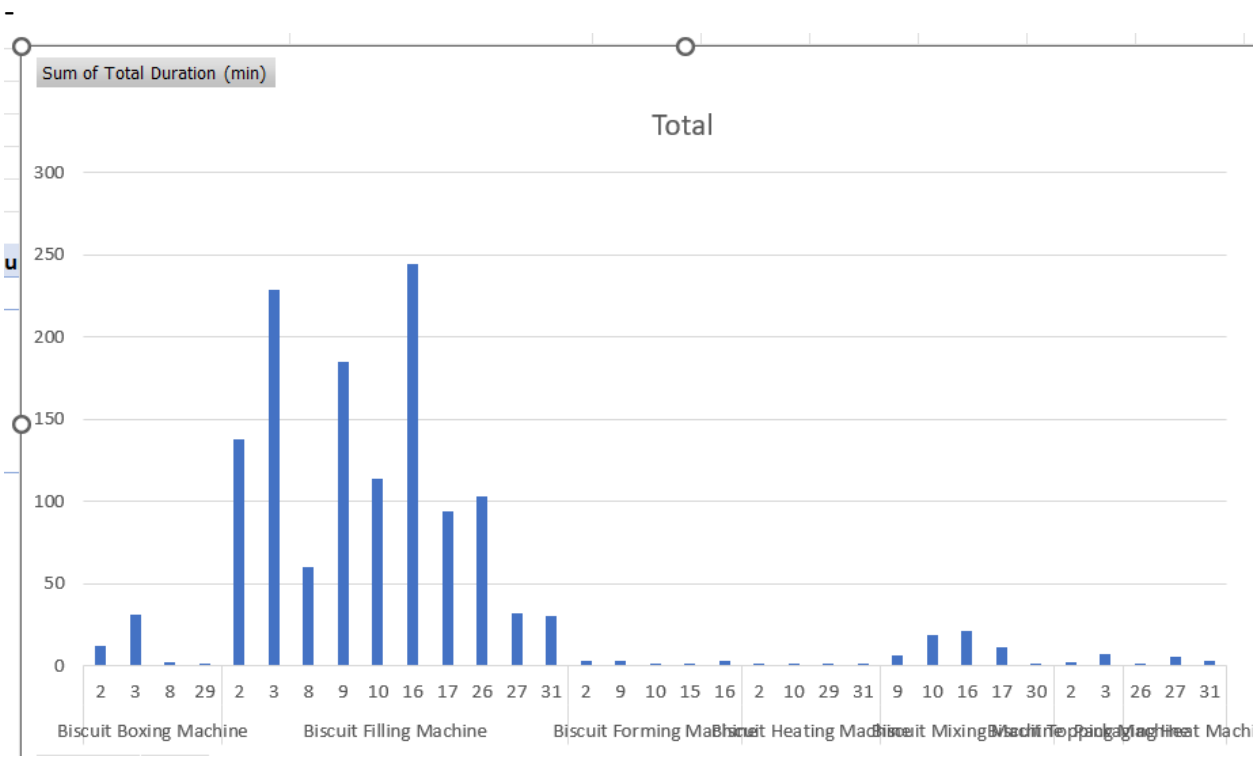

For bourbon cream the biscuit filling machine usage

Here we can clearly see the most time taken by machine for manufacturing of Bourbon Creams Is Biscuit Filling machine.

To find out which day each machine is used the most based on the provided data, you can follow these steps:

```
Machine                 Maximum Day   Total Duration (min)
-------------------------------------------------------
Biscuit Boxing Machine   3             42
Biscuit Filling Machine  3             277
Biscuit Forming Machine  3             10
Biscuit Heating Machine   10            2
Biscuit Mixing Machine    15            36
Biscuit Topping Machine   3             7
Packaging Heat Machine    30            62
Biscuit Jam Machine       31            474
Biscuit Pressing Machine  28            369
Biscuit Sprinkling Machine 28            564
```