WORKFORCE PERFORMANCE AND BONUS DISTRIBUTION ANALYSIS

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PROJECT OVERVIEW

Every production/ manufacturing company access their workforce and machinery at intervals to evaluate staff and machinery performances as well as distribute bonuses if management is impressed.

The dataset used for this project centers around the production department alone and will be used to extract insights, details of which will be revealed in the report.

DATA DETAILS

DATA OVERVIEW

The data set used is a single excel file which contains a simulated data for a production company obtained from Kaggle.com.

The data set consists of production details of individual staff as well as calculated columns on bonus eligibility.

DATA DETAILS

1 → **Worker**
The column contains Staff name

2 → **Gender**
The column contains the gender details of each staff

3 → **Days of absence from work**
Column contains how many days a staff was absent from work

4 → **Hours worked**
The column contains the total hours worked by each staff

5 → **Machinery wear coefficient**
The column contains the numerical details on how quickly the machines wear down

6 → **Units produced**
The column contains the quantity produced by each worker
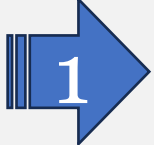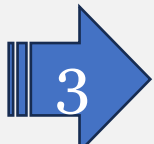
7 → **Bonus columns**
There are 5 bonus columns in the dataset with each having specific requirements from each worker

EXPECTED INSIGHTS

EXPECTED INSIGHTS

1 → **What is the average productivity ratio among the genders?**

2 → **What is the correlation of hours worked to average production?**

3 → **What is the relationship between absent days and production?**

4 → **What is the impact of machinery wear coefficient on production?**

5 → **Are bonuses fairly distributed across the genders?**

5 → **Are the top performers getting more bonuses?**

DATA CLEANING

Data was loaded with Power Query and "Column Quality" in the views tab was turned on to check for individual column quality and no "null entries" or errors were found.

Also, data types were in the right type and no values were replaced.

I then, proceeded to calculating the Bonus columns based on given instructions that came with the dataset

Bonus Columns

Each bonus column was calculated on Microsoft Excel using "If" Expressions as seen below:

BONUS A

Awarded to employees who produced 2,800 units or more:
=IF([@[Units produced]]>=2800,"Eligible"," ")

BONUS B

Given to those with fewer than 4 days of absence and at least 2,600 units produced:
=IF(AND([@[Days of absence from work]]<4,[@[Units produced]]>=2600),"Eligible"," ")

BONUS C

For employees with a machinery wear coefficient of 0.40 or lower, or those who worked 245 hours or more:
=IF(OR([@[Machinery wear coeff.]]<=0.4,[@[Hours worked]]>=245),"Eligible"," ")

Bonus Columns

Each bonus column was calculated on Microsoft Excel using "If" Expressions as seen below:

BONUS D → **Requires a wear coefficient of 0.30 or lower and fewer than 5 days absent, or at least 200 hours worked:**
=IF(AND([@[Machinery wear coeff.]]<=0.3,[@[Days of absence from work]]<5,OR([@[Hours worked]]>200)),"Eligible"," ")

BONUS E → **Specific to female employees with a wear coefficient of 0.30 or lower, or those who produced 2,800 units or more:**
=IF(AND([@Gender]="F",OR([@[Machinery wear coeff.]]<=0.3,[@[Units produced]]>=2800)),"Eligible"," ")

VISUAL ANALYTICS

SUMMARY OF DATA

Total Workers

120

Total Production

303K

Average Hours Worked

201.53

Average Days of Absence

2.48

Productivity Ratio

12.52

Average Machinery Wear Coefficient

0.52

These metrics are only the general summaries as there are gender-based values which will be discussed

SUMMARY OF DATA

Bonus A

31

Filters

Bonus B

38

Filters

Bonus C

56

Filters

Bonus D

16

Filters

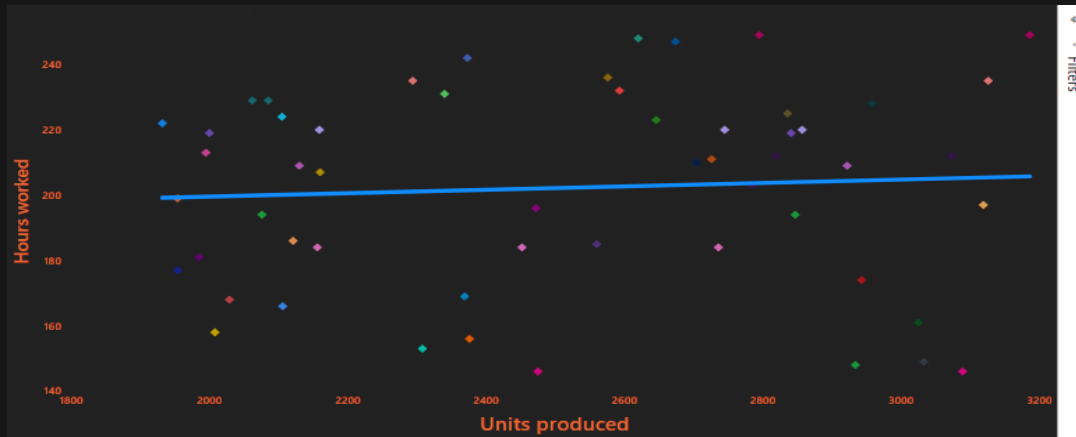**Bonus E**

26

Filters

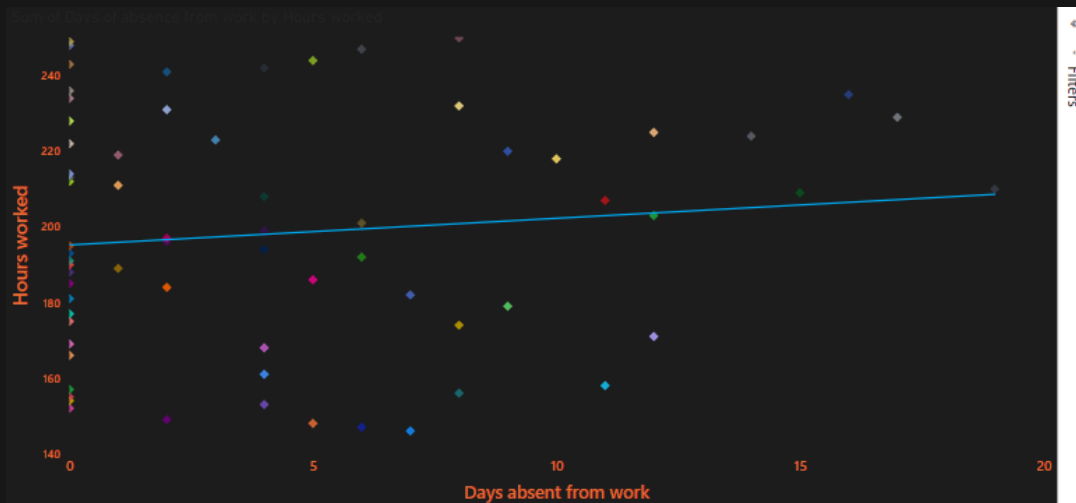**Total Eligible for a Bonus**

80

Filters

Correlations with average production

Overall and across the gender categories, hours worked are slightly positively correlated with units produced.


Days absent from work are also positively correlated to the number of hours worked as most people with the most absent days worked more than 200 hours on the average.
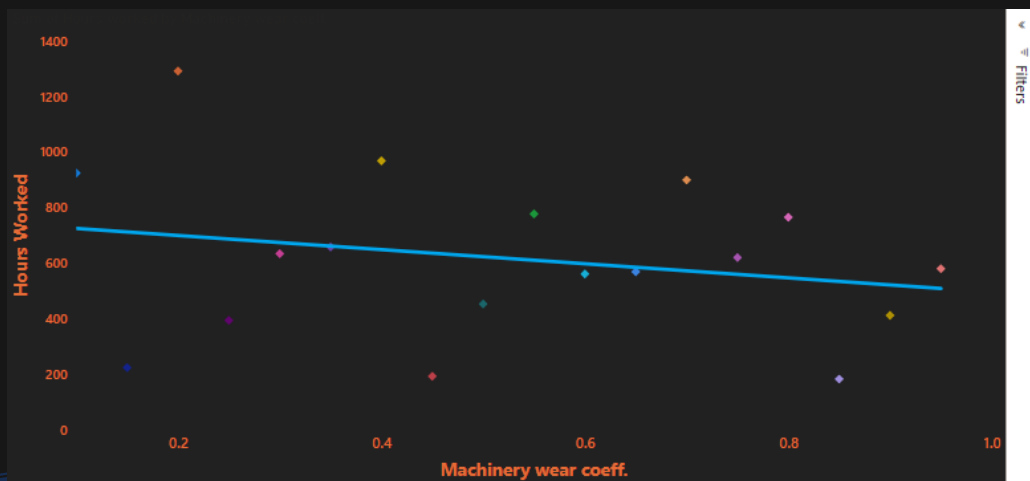
Correlations with average production

Most males who were absent produced fewer units - an average of 2400 while days of absence doesn't affect the production volume for females.

Correlations with average production
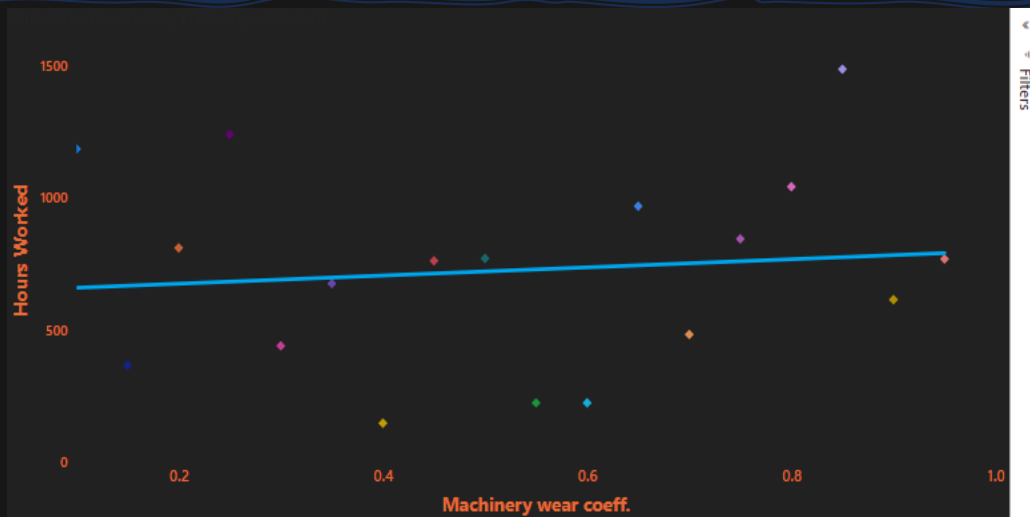
Machinery wear coefficient is slightly positively correlated for the males while it is more negatively correlated for the females.

More males work for longer hours with increased coefficient values while most females work for fewer hours with increased Machinery coefficient

Correlations with average production

The Correlation Matrix below gives further insights to the relationship with average production.

Correlation Matrix	Days of absence	Hours worked	Machinery wear coeff.	Units produced
Days of absence from	1			
Hours worked	0.019559348	1		
Machinery wear coe	-0.048204678	0.010157586	1	
Units produced	-0.089588275	0.062803937	0.038630198	1

Are bonuses fairly distributed across the genders?

Total Workers

120

Total Eligible for a Bonus

80

Total Workers

65

Total Eligible for a Bonus

43

Total Workers

55

Total Eligible for a Bonus

37

Filters

There are a total of 120 workers. Only 80 of them are eligible for at least, 1 bonus level (66.6%).

65 (54%) are males and only 43 of them are eligible for at least, 1 bonus level (66.1%) while 55 (45.8%) are females, and only 37 (67.2%) of them are eligible for at least one bonus.

Are the top performers getting most bonuses?

Top 5 Performers

Worker	Units produced ▼	Total Hours worked
Ornella Caccianemici	3187	249
Jacques Garnier	3185	214
Clifford Fisher	3181	158
Carlos Jiménez	3155	191
Munro Campbell	3149	231

Filters

Top 5 Most Eligible Workers

Worker	Total bonuses ▼
Angelika Herrmann	5
Daniela Guacetti	5
Laetitia Faure	5
Lakeisha Steele	5
Ornella Caccianemici	5

Filters

Top performer, Ornelia Caccianemici only managed to make the top 5. This shows that the selection system is biased and not fully about units produced only.

KEY INSIGHTS AND RECOMMENDATION

KEY INSIGHTS FOUND

1 There are a total of 120 workers: 65 males and 55 females

2 Only 80 (66.67%) of the 120 workers are eligible for at least, 1 bonus category.

3 43 (66.1%) of the eligible 80 are males while 37 (67.2%) are females - The bonus selection is fairly distributed.

4 Total production is 302,663. The male population produced 164, 364 while 134,299 were produced by the females - The males produced more

5 The productivity ratio for the males is 12.59 while that of the females is 12.43 – The males produced more.

KEY INSIGHTS FOUND

6 Average working hours was 201.53 hours. The males averaged 200.92 hours while the females 202.24 hours.

7 Average machinery wear coefficient was 0.52. The males averaged 0.53 while females averaged 0.5. Despite having a lower average machinery wear coefficient, the females worked much longer and produced less than their male counterparts

8 The Bonus E category might have been created just to encourage the female gender and give them a chance to level up with their male counterparts which in turn might have encouraged them to almost catch up with the males in production.

RECOMMENDATION

1 Investigate whether work allocation, machinery type, or training differences are affecting efficiency. Consider skill-based task assignments to improve overall output.

2 Implement training programs focused on improving performance in key areas (efficiency, machine handling, time management) to increase bonus eligibility across more workers.

3 Assess whether Bonus E is truly performance-driven or an incentive for participation. If it boosts morale and performance, consider extending it to other performance-based criteria.

4 Track absenteeism, overtime hours, and worker well-being to identify fatigue trends and optimize work schedules accordingly.

RECOMMENDATION

5 Investigate whether females are using machinery differently or whether different maintenance strategies are in place. Identify if training, load balancing, or improved machine maintenance can optimize efficiency.

6 Conduct performance-based bonus reviews to ensure fairness and prevent potential bias concerns. If Bonus E was meant to bridge a performance gap, future adjustments should ensure it rewards improvement rather than just gender parity

7 Analyze task difficulty, equipment efficiency, and workload allocation for any unnoticed inefficiencies. Consider workshops, automation tools, or ergonomic improvements to improve productivity.

8 Lastly, evaluate whether additional policies (mentorship, flexible work options, leadership programs) can boost performance organically rather than relying solely on incentives

CONCLUSION

1 Optimize machine efficiency and work allocation to improve female productivity.

2 Ensure bonuses are performance-driven while maintaining fairness.

3 Identify and address fatigue factors affecting work output.

4 Encourage skills-based training & development to increase worker eligibility for bonuses.
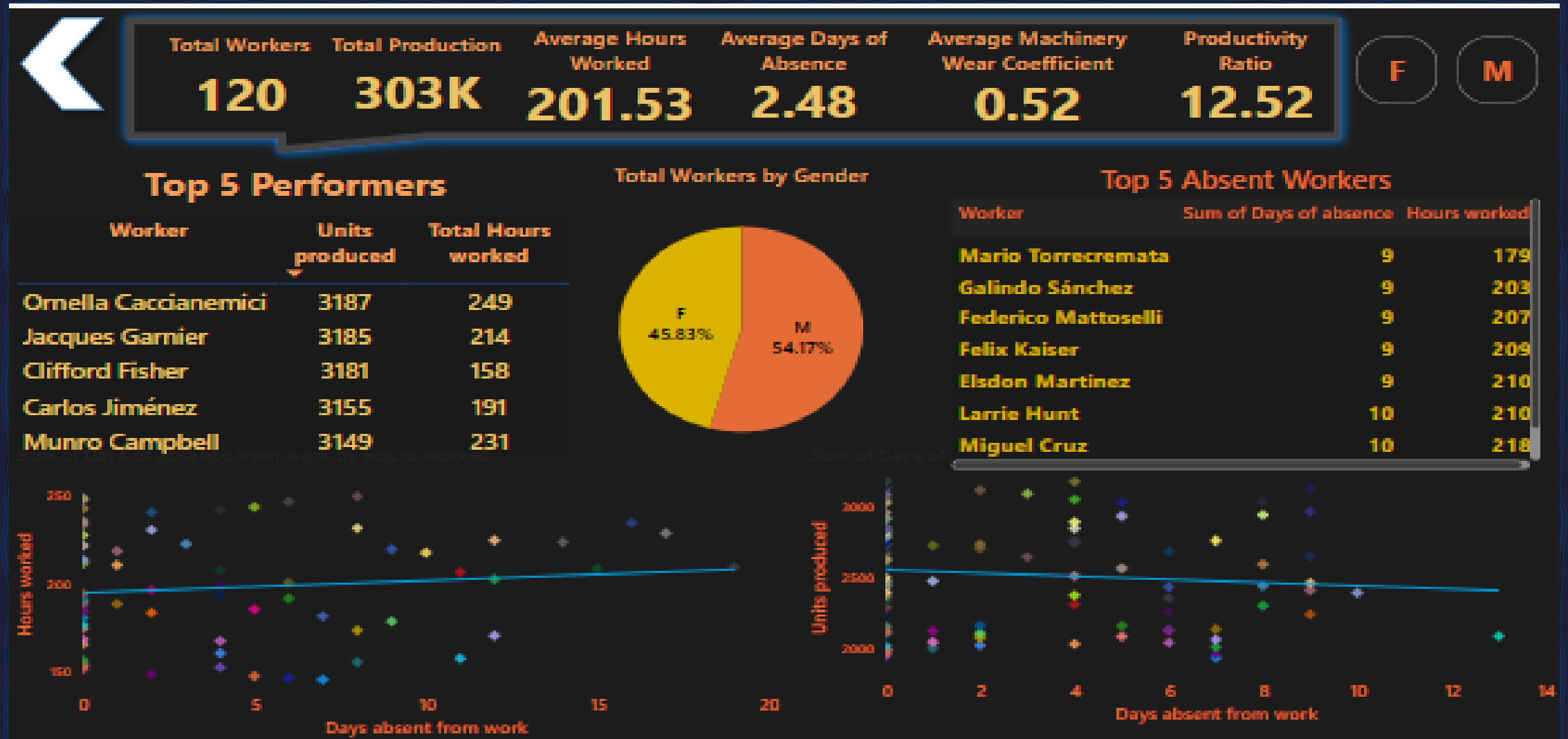
DASHBOARD

DASHBOARD PAGES VIEW

DASHBOARD PAGES VIEW

THANK

YOU