

Production & Rejection Data analysis project using Python

May 29, 2023

1 April Month Production and Rejection Data

```
[1]: !pip install matplotlib  
      !pip install pandas  
      !pip install NumPy  
      !pip install seaborn
```

```
Requirement already satisfied: matplotlib in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (3.7.1)  
Requirement already satisfied: contourpy>=1.0.1 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from  
matplotlib) (1.0.7)  
Requirement already satisfied: cycler>=0.10 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from  
matplotlib) (0.11.0)  
Requirement already satisfied: fonttools>=4.22.0 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from  
matplotlib) (4.39.4)  
Requirement already satisfied: kiwisolver>=1.0.1 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from  
matplotlib) (1.4.4)  
Requirement already satisfied: numpy>=1.20 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from  
matplotlib) (1.24.3)  
Requirement already satisfied: packaging>=20.0 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from  
matplotlib) (23.1)  
Requirement already satisfied: pillow>=6.2.0 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from  
matplotlib) (9.5.0)  
Requirement already satisfied: pyparsing>=2.3.1 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from  
matplotlib) (3.0.9)  
Requirement already satisfied: python-dateutil>=2.7 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from  
matplotlib) (2.8.2)  
Requirement already satisfied: six>=1.5 in  
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
```

```

python-dateutil>=2.7->matplotlib) (1.16.0)
Requirement already satisfied: pandas in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (2.0.1)
Requirement already satisfied: python-dateutil>=2.8.2 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
pandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
pandas) (2023.3)
Requirement already satisfied: tzdata>=2022.1 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
pandas) (2023.3)
Requirement already satisfied: numpy>=1.21.0 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
pandas) (1.24.3)
Requirement already satisfied: six>=1.5 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
python-dateutil>=2.8.2->pandas) (1.16.0)
Requirement already satisfied: NumPy in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages
(1.24.3)
Requirement already satisfied: seaborn in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages
(0.12.2)
Requirement already satisfied: numpy!=1.24.0,>=1.17 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
seaborn) (1.24.3)
Requirement already satisfied: pandas>=0.25 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
seaborn) (2.0.1)
Requirement already satisfied: matplotlib!=3.6.1,>=3.1 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
seaborn) (3.7.1)
Requirement already satisfied: contourpy>=1.0.1 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
matplotlib!=3.6.1,>=3.1->seaborn) (1.0.7)
Requirement already satisfied: cycler>=0.10 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
matplotlib!=3.6.1,>=3.1->seaborn) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
matplotlib!=3.6.1,>=3.1->seaborn) (4.39.4)
Requirement already satisfied: kiwisolver>=1.0.1 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
matplotlib!=3.6.1,>=3.1->seaborn) (1.4.4)
Requirement already satisfied: packaging>=20.0 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
matplotlib!=3.6.1,>=3.1->seaborn) (23.1)

```

Requirement already satisfied: pillow>=6.2.0 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
matplotlib!=3.6.1,>=3.1->seaborn) (9.5.0)
Requirement already satisfied: pyparsing>=2.3.1 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
matplotlib!=3.6.1,>=3.1->seaborn) (3.0.9)
Requirement already satisfied: python-dateutil>=2.7 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
matplotlib!=3.6.1,>=3.1->seaborn) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
pandas>=0.25->seaborn) (2023.3)
Requirement already satisfied: tzdata>=2022.1 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
pandas>=0.25->seaborn) (2023.3)
Requirement already satisfied: six>=1.5 in
c:\users\hites\appdata\local\programs\python\python311\lib\site-packages (from
python-dateutil>=2.7->matplotlib!=3.6.1,>=3.1->seaborn) (1.16.0)

```
[2]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from matplotlib import style
import seaborn as sns
import matplotlib.colors as mcolors
```

```
[3]: df = pd.read_csv(r"C:\Users\hites\OneDrive\Desktop\HPDC Prod_Data.csv")
```

```
[4]: df.shape
```

```
[4]: (22, 75)
```

```
[5]: df.head()
```

```
[5]:
```

	Date	O.P Time (min)	Stop time (min)	Cycle Time (sec)	
0	3-Apr	2700	745	126	\
1	4-Apr	4110	890	126	
2	5-Apr	4050	1120	126	
3	6-Apr	4080	1060	126	
4	7-Apr	3525	960	126	

	Good Number (pcs)	Defect Number (pcs)	Preheating shot nos. (pcs)	
0	859	12	45	\
1	1465	18	49	
2	1315	20	47	
3	1313	22	55	
4	1127	16	46	

	Rejection ratio (%) each day	Productivity (%)	Preheating shot Ratio (%)
0	6.22	66.81	4.91 \
1	4.37	74.85	3.20
2	4.85	68.19	3.40
3	5.54	67.58	3.96
4	5.21	67.14	3.87

	Water leakage from die	Die Limit Switch	Die Cooling NG
0	20	0	30 \
1	0	30	0
2	30	0	60
3	50	0	100
4	0	220	30

	Chip off Trouble	Die Flash Trouble	Die change due to Die trouble
0	0	0	0 \
1	0	10	0
2	0	10	160
3	30	0	0
4	0	10	0

	V.Valve Trouble	Other.1	Total Breakdowns	Breakdown %
0	130	0	745	27.59
1	30	125	890	21.65
2	205	0	1120	27.65
3	65	70	1060	25.98
4	0	105	960	27.23

[5 rows x 75 columns]

```
[6]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 22 entries, 0 to 21
```

```
Data columns (total 75 columns):
```

#	Column	Non-Null Count	Dtype
0	Date	22 non-null	object
1	O.P Time (min)	22 non-null	int64
2	Stop time (min)	22 non-null	int64
3	Cycle Time (sec)	22 non-null	int64
4	Good Number (pcs)	22 non-null	int64
5	Defect Number (pcs)	22 non-null	int64
6	Preheating shot nos. (pcs)	22 non-null	int64
7	Rejection ratio (%) each day	22 non-null	float64
8	Productivity (%)	22 non-null	float64
9	Preheating shot Ratio (%)	22 non-null	float64
10	SPH (each day)	22 non-null	float64

11	AVERAGE Rejection ratio (%)	22	non-null	float64
12	Preheating shot Ratio (%).1	22	non-null	float64
13	AVERAGE SPH	22	non-null	float64
14	Wrinkle	22	non-null	int64
15	Water Remainants	22	non-null	int64
16	Crack	22	non-null	int64
17	Dent	22	non-null	int64
18	Chip off	22	non-null	int64
19	Pin brake	22	non-null	int64
20	Pin Bend	22	non-null	int64
21	QC cut	22	non-null	int64
22	PDI NG	22	non-null	int64
23	2D Marking NG	22	non-null	int64
24	Other	22	non-null	int64
25	Preparation	22	non-null	int64
26	T R B	22	non-null	int64
27	V. Valve change	22	non-null	int64
28	U R B	22	non-null	int64
29	Holding furnace cleaning	22	non-null	int64
30	Tip/Sleeve change	22	non-null	int64
31	Process Quality requirement	22	non-null	int64
32	Spray point set	22	non-null	int64
33	DRA supply shortage	22	non-null	int64
34	Biscuit broken	22	non-null	int64
35	Water leakage	22	non-null	int64
36	Ladle change	22	non-null	int64
37	Scrap trolley Alarm	22	non-null	int64
38	Metal temp. low / Low Metal Level(Melting)	22	non-null	int64
39	N2 Charging	22	non-null	int64
40	Injection jaam	22	non-null	int64
41	Robot Teaching	22	non-null	int64
42	Production robot prob	22	non-null	int64
43	Die change as per plan	22	non-null	int64
44	Others	22	non-null	int64
45	Electrical	22	non-null	int64
46	Hydraulic	22	non-null	int64
47	Oil leakage	22	non-null	int64
48	Water Flow NG / Leakage	22	non-null	int64
49	Vacuum	22	non-null	int64
50	Pouring ladle Equipment	22	non-null	int64
51	Die Release Agent Equipment (DRA)	22	non-null	int64
52	Jet Cooler	22	non-null	int64
53	Lubrication (Machine / Tip)	22	non-null	int64
54	Ejector / C&D Plate	22	non-null	int64
55	Door	22	non-null	int64
56	Laser Marking	22	non-null	int64
57	Cutting / Degating machine	22	non-null	int64
58	Injection Problem	22	non-null	int64

59	Others.1	22 non-null	int64
60	Scoring / Polishing	22 non-null	int64
61	Casting stuck	22 non-null	int64
62	Die Pin Bend	22 non-null	int64
63	Die Pin broken	22 non-null	int64
64	Die not available	22 non-null	int64
65	Water leakage from die	22 non-null	int64
66	Die Limit Switch	22 non-null	int64
67	Die Cooling NG	22 non-null	int64
68	Chip off Trouble	22 non-null	int64
69	Die Flash Trouble	22 non-null	int64
70	Die change due to Die trouble	22 non-null	int64
71	V.Valve Trouble	22 non-null	int64
72	Other.1	22 non-null	int64
73	Total Breakdowns	22 non-null	int64
74	Breakdown %	22 non-null	float64

dtypes: float64(8), int64(66), object(1)

memory usage: 13.0+ KB

```
[7]: #drop unrelated/blank columns
df.drop(['Other', 'Other.1'], axis=1, inplace=True)
```

```
[8]: #drop unrelated/blank columns
df.drop(['Others', 'Others.1'], axis=1, inplace=True)
```

```
[9]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 22 entries, 0 to 21
```

```
Data columns (total 71 columns):
```

#	Column	Non-Null Count	Dtype
---	-----	-----	-----
0	Date	22 non-null	object
1	O.P Time (min)	22 non-null	int64
2	Stop time (min)	22 non-null	int64
3	Cycle Time (sec)	22 non-null	int64
4	Good Number (pcs)	22 non-null	int64
5	Defect Number (pcs)	22 non-null	int64
6	Preheating shot nos. (pcs)	22 non-null	int64
7	Rejection ratio (%) each day	22 non-null	float64
8	Productivity (%)	22 non-null	float64
9	Preheating shot Ratio (%)	22 non-null	float64
10	SPH (each day)	22 non-null	float64
11	AVERAGE Rejection ratio (%)	22 non-null	float64
12	Preheating shot Ratio (%).1	22 non-null	float64
13	AVERAGE SPH	22 non-null	float64
14	Wrinkle	22 non-null	int64
15	Water Remainants	22 non-null	int64

16	Crack	22	non-null	int64
17	Dent	22	non-null	int64
18	Chip off	22	non-null	int64
19	Pin brake	22	non-null	int64
20	Pin Bend	22	non-null	int64
21	QC cut	22	non-null	int64
22	PDI NG	22	non-null	int64
23	2D Marking NG	22	non-null	int64
24	Preparation	22	non-null	int64
25	T R B	22	non-null	int64
26	V. Valve change	22	non-null	int64
27	U R B	22	non-null	int64
28	Holding furnace cleaning	22	non-null	int64
29	Tip/Sleeve change	22	non-null	int64
30	Process Quality requirement	22	non-null	int64
31	Spray point set	22	non-null	int64
32	DRA supply shortage	22	non-null	int64
33	Biscuit broken	22	non-null	int64
34	Water leakage	22	non-null	int64
35	Ladle change	22	non-null	int64
36	Scrap trolley Alarm	22	non-null	int64
37	Metal temp. low / Low Metal Level(Melting)	22	non-null	int64
38	N2 Charging	22	non-null	int64
39	Injection jaam	22	non-null	int64
40	Robot Teaching	22	non-null	int64
41	Production robot prob	22	non-null	int64
42	Die change as per plan	22	non-null	int64
43	Electrical	22	non-null	int64
44	Hydraulic	22	non-null	int64
45	Oil leakage	22	non-null	int64
46	Water Flow NG / Leakage	22	non-null	int64
47	Vacuum	22	non-null	int64
48	Pouring ladle Equipment	22	non-null	int64
49	Die Release Agent Equipment (DRA)	22	non-null	int64
50	Jet Cooler	22	non-null	int64
51	Lubrication (Machine / Tip)	22	non-null	int64
52	Ejector / C&D Plate	22	non-null	int64
53	Door	22	non-null	int64
54	Laser Marking	22	non-null	int64
55	Cutting / Degating machine	22	non-null	int64
56	Injection Problem	22	non-null	int64
57	Scoring / Polishing	22	non-null	int64
58	Casting stuck	22	non-null	int64
59	Die Pin Bend	22	non-null	int64
60	Die Pin broken	22	non-null	int64
61	Die not available	22	non-null	int64
62	Water leakage from die	22	non-null	int64
63	Die Limit Switch	22	non-null	int64

```

64 Die Cooling NG                22 non-null    int64
65 Chip off Trouble              22 non-null    int64
66 Die Flash Trouble             22 non-null    int64
67 Die change due to Die trouble 22 non-null    int64
68 V.Valve Trouble               22 non-null    int64
69 Total Breakdowns              22 non-null    int64
70 Breakdown %                   22 non-null    float64
dtypes: float64(8), int64(62), object(1)
memory usage: 12.3+ KB

```

```

[10]: #to check null value
pd.isnull(df).sum()

```

```

[10]: Date                0
      O.P Time (min)      0
      Stop time (min)     0
      Cycle Time (sec)    0
      Good Number (pcs)   0
      ..
      Die Flash Trouble   0
      Die change due to Die trouble 0
      V.Valve Trouble     0
      Total Breakdowns    0
      Breakdown %         0
      Length: 71, dtype: int64

```

```

[11]: df.shape

```

```

[11]: (22, 71)

```

2 Plotting a bar chart for Date vs Rejection %

```

[12]: # function to add value labels
def addlabels(x,y):
    for i in range(len(x)):
        plt.text(i, y[i], y[i], ha = 'center')

if __name__ == '__main__':
    # creating the dataset
    y = df['Rejection ratio (%) each day']
    x = df['Date']

    # Figure Size
    fig = plt.figure(figsize =(18, 6))

    # calling the function to add value labels
    addlabels(x, y)

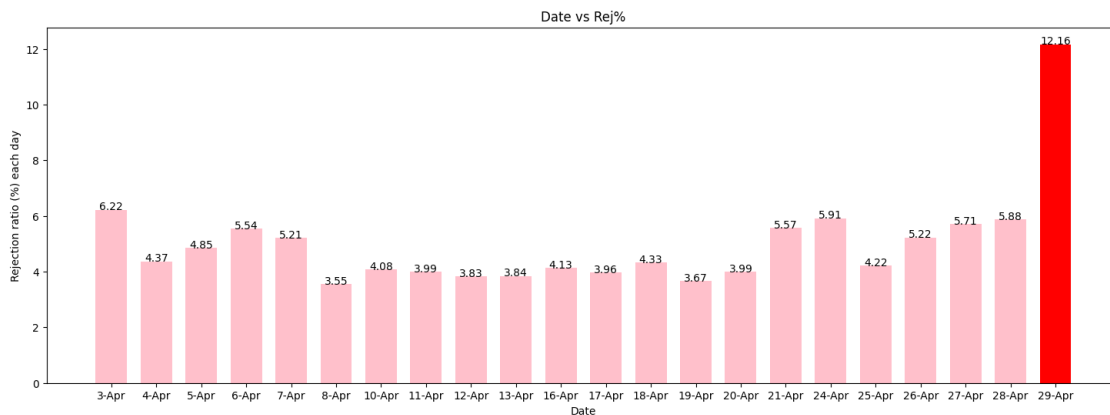
```



```
# Style the graph
# style.use('dark_background')

# creating the bar plot
color = □
→ ['pink','pink','pink','pink','pink','pink','pink','pink','pink','pink','pink','pink']
plt.bar(x,y,color=color,width=0.7)

plt.xlabel("Date")
plt.ylabel("Rejection ratio (%) each day")
plt.title("Date vs Rej%")
plt.show()
```



#Highest rejection in April month is in 29Apr production which is 12.16%

```
[13]: df.tail(1)
```

```
[13]:
```

	Date	O.P Time (min)	Stop time (min)	Cycle Time (sec)	
21	29-Apr	3750	900	126	\
	Good Number (pcs)	Defect Number (pcs)	Preheating shot nos. (pcs)		
21	1308	117	64	\	
	Rejection ratio (%) each day	Productivity (%)	Preheating shot Ratio (%)		
21	12.16	73.25	4.3	\	
	... Die not available	Water leakage from die	Die Limit Switch		
21	...	0	80	0	\
	Die Cooling NG	Chip off Trouble	Die Flash Trouble		

```

21          50          0          20 \

Die change due to Die trouble V.Valve Trouble Total Breakdowns
21          0          25          900 \

Breakdown %
21          24.0

```

[1 rows x 71 columns]

#Defects are from column “Wrinkle” to “2D Marking NG”

```

[14]: #Find index number of column
column = 'Wrinkle'
index_no = df.columns.get_loc(column)
print(index_no)

```

14

```

[15]: column = '2D Marking NG'
index_no = df.columns.get_loc(column)
print(index_no)

```

23

```

[16]: #df.loc[21, 'Wrinkle': '2D Marking NG']
#or
df.iloc[21, 14:24]

```

```

[16]: Wrinkle          0
Water Remainants    100
Crack               0
Dent                0
Chip off            0
Pin brake           0
Pin Bend            0
QC cut              14
PDI NG              0
2D Marking NG       0
Name: 21, dtype: object

```

29-Apr rejection data: Water Remainants=100 comps, QC cut=14 comps

3 Plotting a bar chart of 29-Apr rejection.

```

[17]: # function to add value labels
d = {'y': ['Wrinkle', 'Water Remainants', 'Crack', 'Dent', 'Chip off', 'Pin_
↳brake', 'Pin Bend', 'QC cut', 'PDI NG', '2D Marking NG'],

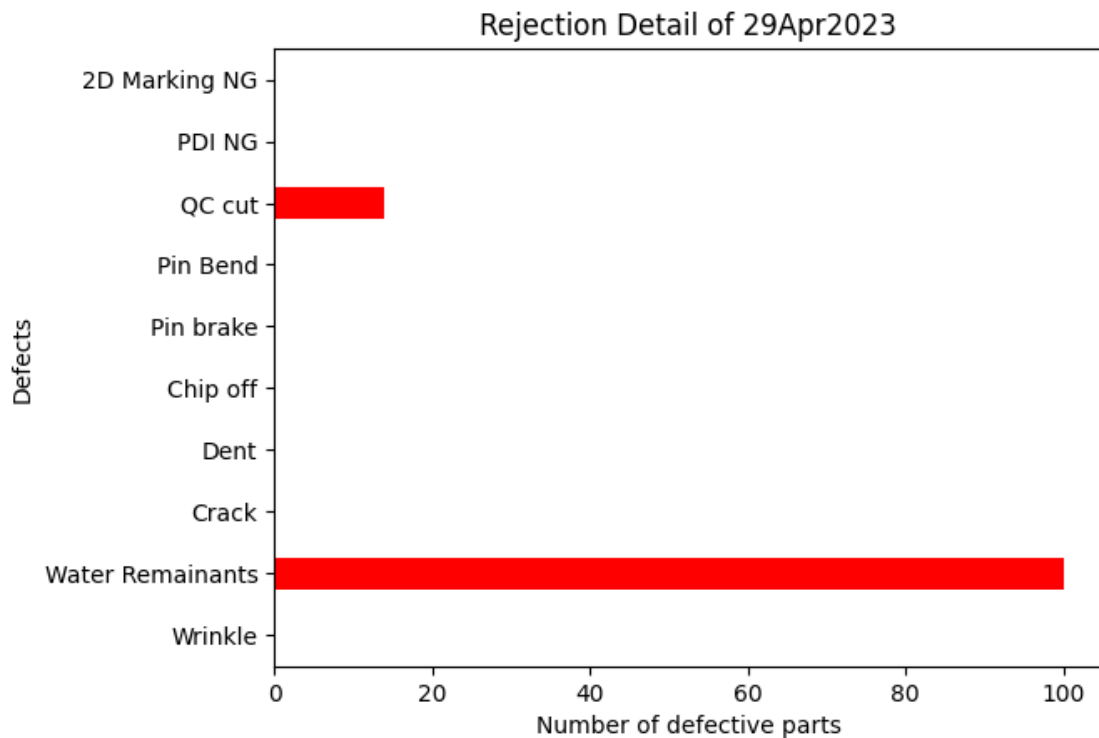
```

```

    'x': [[0,100,0,0,0,0,0,14,0,0]],
    'index': [1]}
df = pd.DataFrame(d['x'], columns=d['y'], index=d['index'])

row = df.iloc[0]
row.plot(kind='barh',color='red')
plt.xlabel("Number of defective parts")
plt.ylabel("Defects")
plt.title("Rejection Detail of 29Apr2023")
plt.show()

```



This is rejection details of 29-Apr production. As per this, there are 2 major rejections. One is QC Cut and other is Water Remainants

4 Plotting a bar chart for Date vs Breakdown %

```
[18]: df = pd.read_csv(r"C:\Users\hites\OneDrive\Desktop\HPDC Prod_Data.csv")
```

```
[19]: #drop unrelated/blank columns
df.drop(['Other', 'Other.1'], axis=1, inplace=True)
```

```
[20]: #drop unrelated/blank columns
df.drop(['Others', 'Others.1'], axis=1, inplace=True)
```

```
[21]: # function to add value labels
def addlabels(x,y):
    for i in range(len(x)):
        plt.text(i, y[i], y[i], ha = 'center')

if __name__ == '__main__':
    # creating the dataset
    y = df['Breakdown %']
    x = df['Date']

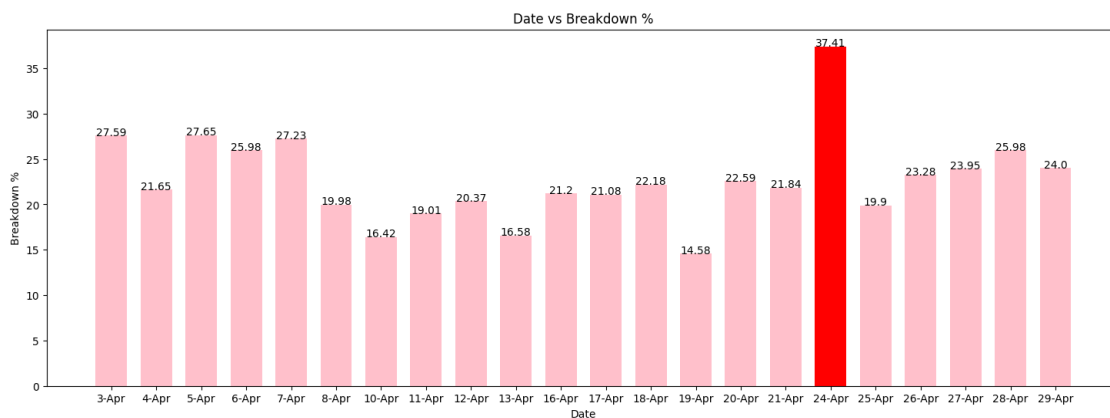
    # Figure Size
    fig = plt.figure(figsize =(18, 6))

    # calling the function to add value labels
    addlabels(x, y)

    # Style the graph
    #style.use('dark_background')

    # creating the bar plot
    color = _
    ↪['pink','pink','pink','pink','pink','pink','pink','pink','pink','pink','pink','pink','pink','pink']
    plt.bar(x,y,color=color,width=0.7)

    plt.xlabel("Date")
    plt.ylabel("Breakdown %")
    plt.title("Date vs Breakdown %")
    plt.show()
```



#Highest Breakdown is on 24-Apr which is 37.41%

5 Plotting bar chart of 24-Apr Production,E/M & D/M Breakdowns.

6 1. bar chart of 24-Apr Production Breakdowns

#Note: Production Breakdown is from column “Preparation” to “Die change as per plan”.

```
[22]: #Find index number of column
      column = 'Preparation'
      index_no = df.columns.get_loc(column)
      print(index_no)
```

24

```
[23]: #Find index number of column
      column = 'Die change as per plan'
      index_no = df.columns.get_loc(column)
      print(index_no)
```

42

```
[24]: df1=df
```

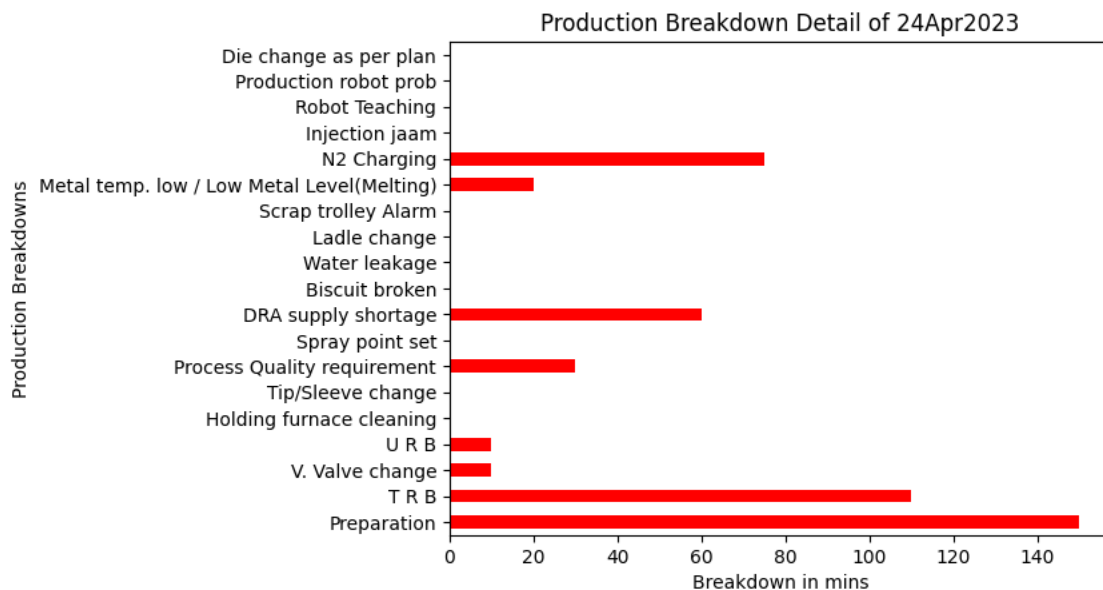
```
[25]: df1.iloc[16,24:43]
```

```
[25]: Preparation          150
      T R B                110
      V. Valve change      10
      U R B                10
      Holding furnace cleaning  0
      Tip/Sleeve change     0
      Process Quality requirement 30
      Spray point set        0
      DRA supply shortage   60
      Biscuit broken         0
      Water leakage         0
      Ladle change          0
      Scrap trolley Alarm    0
      Metal temp. low / Low Metal Level(Melting) 20
      N2 Charging           75
      Injection jaam         0
      Robot Teaching        0
      Production robot prob  0
      Die change as per plan  0
      Name: 16, dtype: object
```

#Above data is showing Production breakdowns in mins on 24-Apr. Major production breakdown is 'Preparation' breakdown which is 150 mins.

```
[26]: # function to add value labels
d = {'y': ['Preparation', 'T R B', 'V. Valve change', 'U R B', 'Holding furnace_
↳cleaning', 'Tip/Sleeve change', 'Process Quality requirement', 'Spray point_
↳set', 'DRA supply shortage', 'Biscuit broken', 'Water leakage', 'Ladle_
↳change', 'Scrap trolley Alarm', 'Metal temp. low / Low Metal_
↳Level(Melting)', 'N2 Charging', 'Injection jaam', 'Robot Teaching', 'Production_
↳robot prob', 'Die change as per plan'], 'x':_
↳[[150,110,10,10,0,0,30,0,60,0,0,0,0,20,75,0,0,0,0]],
    'index': [1]}
df2 = pd.DataFrame(d['x'], columns=d['y'], index=d['index'])

row = df2.iloc[0]
row.plot(kind='barh',color='red')
plt.xlabel("Breakdown in mins")
plt.ylabel("Production Breakdowns")
plt.title("Production Breakdown Detail of 24Apr2023")
plt.show()
```



#This is 24-Apr production brekaown bar chart.

7 2. Plotting bar chart of 24-Apr E/M Breakdowns.

#Note: E/M Breakdown is from column "Electrical" to "Injection Problem".

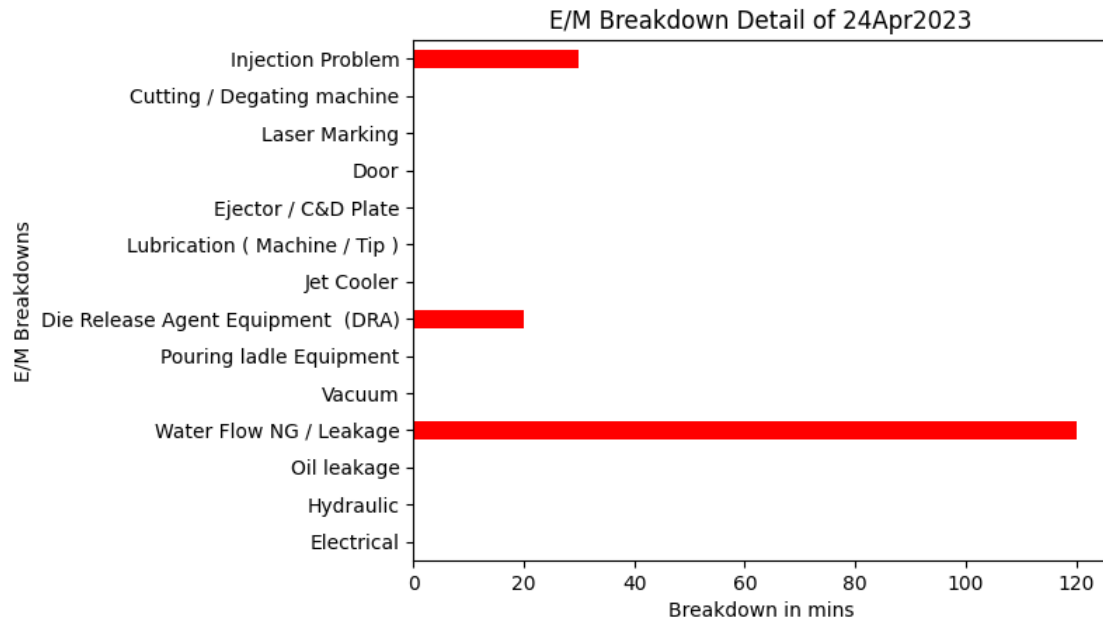
```
[27]: df1=df
      df1.iloc[16,43:57]
```

```
[27]: Electrical          0
      Hydraulic          0
      Oil leakage        0
      Water Flow NG / Leakage 120
      Vacuum            0
      Pouring ladle Equipment 0
      Die Release Agent Equipment (DRA) 20
      Jet Cooler         0
      Lubrication ( Machine / Tip ) 0
      Ejector / C&D Plate 0
      Door               0
      Laser Marking      0
      Cutting / Degating machine 0
      Injection Problem   30
      Name: 16, dtype: object
```

#Above data is showing E/M breakdowns in mins on 24-Apr. Major production breakdown is 'Water Flow NG/Leakage' breakdown which is 120 mins.

```
[28]: # function to add value labels
d = {'y': ['Electrical','Hydraulic','Oil leakage','Water Flow NG / Leakage',
          'Vacuum','Pouring ladle Equipment','Die Release Agent Equipment (DRA)',
          'Jet Cooler','Lubrication ( Machine / Tip )','Ejector / C&D Plate',
          'Door','Laser Marking','Cutting / Degating machine','Injection Problem'],
      'x': [[0,0,0,120,0,0,20,0,0,0,0,0,0,30]],
      'index': [1]}
df2 = pd.DataFrame(d['x'], columns=d['y'], index=d['index'])

row = df2.iloc[0]
row.plot(kind='barh',color='red')
plt.xlabel("Breakdown in mins")
plt.ylabel("E/M Breakdowns")
plt.title("E/M Breakdown Detail of 24Apr2023")
plt.show()
```



#This is 24-Apr production brekaown bar chart.

8 3. Plotting bar chart of 24-Apr D/M Breakdowns.

Note: D/M Breakdown is from column “Scoring / Polishing” to “V.Valve Trouble”.

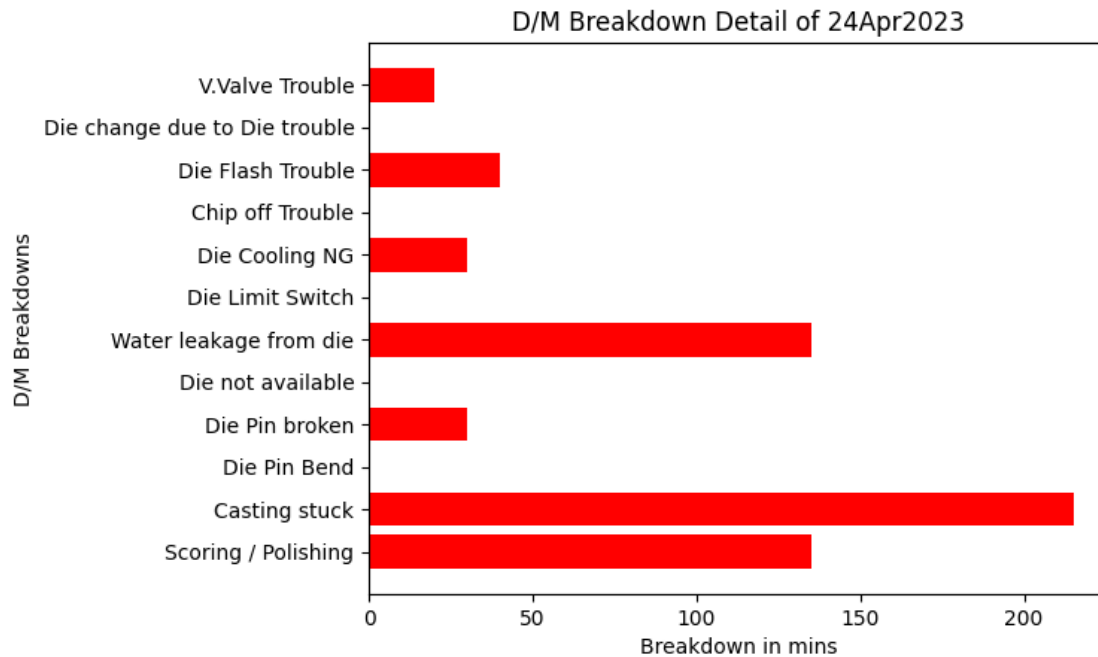
```
[29]: df1=df
      df2= df1.iloc[16,57:69]
      df2
```

```
[29]: Scoring / Polishing      135
      Casting stuck           215
      Die Pin Bend             0
      Die Pin broken           30
      Die not available         0
      Water leakage from die    135
      Die Limit Switch          0
      Die Cooling NG           30
      Chip off Trouble          0
      Die Flash Trouble         40
      Die change due to Die trouble 0
      V.Valve Trouble           20
      Name: 16, dtype: object
```

#Above data is showing D/M breakdowns in mins on 24-Apr. Major production breakdown is ‘Casting stuck’ breakdown which is 215 mins.


```
[30]: Y = list(df.iloc[16,57:69])
X = list(df.iloc[:,57:69])

# Plot the data using bar() method
plt.barh(X, Y, color='red')
plt.xlabel("Breakdown in mins")
plt.ylabel("D/M Breakdowns")
plt.title("D/M Breakdown Detail of 24Apr2023")
plt.show()
```



#This is 24-Apr D/M brekaown bar chart.

9 CONCLUSION

10 Rejection Conclusion:

# Highest rejection date:	29-April
# Rejection % on 29-April:	12.16%
# Major Defect in 29-April rejection:	Water Remainants
# Water Remainants parts on 29-April:	100

11 Breakdown Conclusion:

# Highest breakdown date:	24-April
# Breakdown % on 24-April:	37.41%

# Major Production breakdown on 24-April:	Preparation
# Preparation breakdown on 24-April:	150 minutes
# Major E/M breakdown on 24-April:	Water Flow NG / Leakage
# Water Flow NG / Leakage breakdown on 24-April:	120 minutes
# Major D/M breakdown on 24-April:	Casting stuck
# Casting stuck breakdown on 24-April:	215 minutes