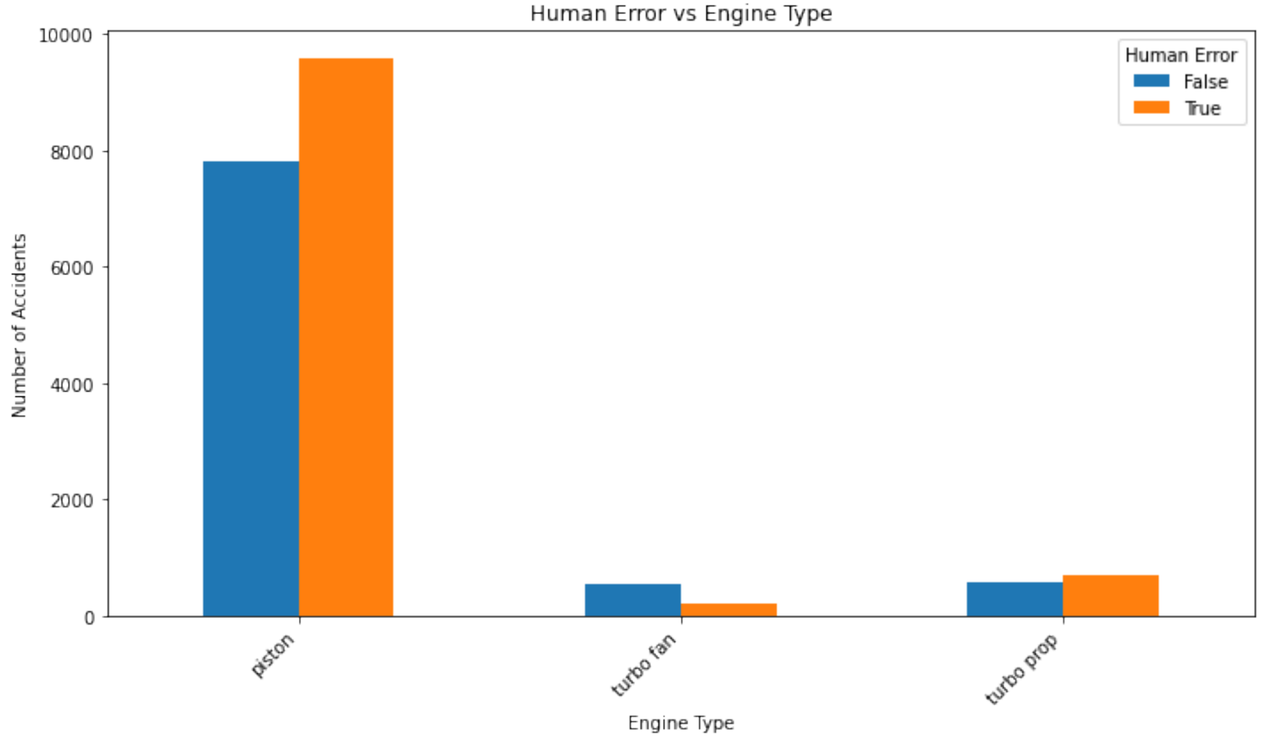
In [859]:
```
human_and_weather_error = df.loc[df['cause of event'].str.contains(
    'pilot|wind|gust|weather|visibility|visible|visual|ice|turbulence|turbulent|fog|dark|viually|storm|rain|snow|meteorological|conditions|icing',
    case=False, na=False), 'cause of event']
```

In [860]:
```
df['has_human_weather_error'] = df['cause of event'].str.contains(
    'pilot|wind|gust|weather|visibility|visible|visual|ice|turbulence|turbulent|fog|dark|viually|storm|rain|snow|meteorological|conditions|icing',
    case=False,
    na=False)
```

In [861]:
```
df['has_human_weather_error'].value_counts()
```

Out[861]:
```
has_human_weather_error
True     10203
False     9223
Name: count, dtype: int64
```

In [863]:
```
#Compare human error events with different engine types
human_error_by_engine= df.groupby(['engine type', 'has_human_error']).size().unstack(fill_value=0)
human_error_by_engine.plot(kind='bar', figsize=(10, 6))
plt.title('Human Error vs Engine Type')
plt.xlabel('Engine Type')
plt.ylabel('Number of Accidents')
plt.xticks(rotation=45, ha='right')
plt.legend(title='Human Error')
plt.tight_layout()
plt.show()
```




## Conclusions