Kernel: Python 3 (system-wide)

In [1]:
```python
import numpy as np
from matplotlib import pyplot as plt
```

In [2]:
```python
# sigularities
def sing(x,a,n):
    if not isinstance(x, np.ndarray):
        x = np.array([x])
    ni = np.zeros(x.size)
    for i in range(x.size):
        if x[i] >=a and n>=0:
            ni[i] = (x[i]-a)**n
    return ni/np.math.factorial(n)

def lx(a,pc,pp=None):
    xxi = pp if pp is not None else xx
    return m*((1-pc)*sing(xxi,0,a)-p1(pc)*sing(xxi,l0,a)-
p2(pc)*sing(xxi,l1,a)+pc/2*(sing(xxi,lw1,a)+sing(xxi,lw2,a)))

def p1(pc):
    return 2.5-2.4625*pc

def p2(pc):
    return 2.4625*pc-1.5

def trail(a,b,pc, l2,l3):
    return m*(p1(pc)*sing(xt,0,a)+p2(pc)*sing(xt,80,a)-(sing(xt,l3,b)-
sing(xt,l3+l2,b))/l2)
```

In [3]:
```python
#constants
l1 = 200
l0 =120
lw1 = 179
lw2 = 215
m = 18400
S = 5.61
s2 = 5.46
```

In [4]:
```python
# predefined arrays
xx = np.linspace(0,220)
xt = np.linspace(0,150)
lii = np.linspace(10, 120, 15)
```

In [5]:
```python
o_m_l = []
max_loc = []
m_full = []

o_m_l_t = []
```

```
max_loc_t = []
m_full_t = []

# loop through locations
for lis in lii:

    # initialize constants for each
    max_p = [[0,0]]
    l_f = []

    max_p_t = [[0,0]]
    l_f_t = []

#     min_x_x = lis/40

#     print('-minx: ', min_x)
    for p in np.arange(0.6,1,0.1):
        l4 = 197*p-lis/2-120  # calculates resulting length

        #singularity
        load = lx(0,p)
        mom = lx(1,p)
        tip_l = trail(0,1,p, lis,l4)
        tip_m = trail(1,2,p, lis,l4)
        sig = mom/(2*S)  # stress
        sig_t = tip_m/(2*s2)

        l_f.append([load, mom, sig])
        max_sig = np.max(np.abs(sig))

        max_p.append([p*1, max_sig*1])  # max stress for this loading
condition and this location

        l_f_t.append([tip_l, tip_m, sig_t])
        max_sig_t = np.max(np.abs(sig_t))

        max_p_t.append([p*1, max_sig_t*1])  # max stress for this loading
condition and this location

    # tabulation of this location, and max of location
    max_p = np.array(max_p)
    m_full.append(l_f)
    m_n = np.argmax(max_p,0)
    m_a = max_p[m_n[1],:]

    # adding to list of all locs
    max_loc.append(max_p)
    o_m_l.append(m_a)

    # tabulation of this location, and max of location
    max_p_t = np.array(max_p_t)
    m_full_t.append(l_f_t)
    m_n_t = np.argmax(max_p_t,0)
    m_a_t = max_p_t[m_n_t[1],:]

    # adding to list of all locs
    max_loc_t.append(max_p_t)
    o_m_l_t.append(m_a_t)

# max of all
o_m_l = np.array(o_m_l)
m_aa = np.argmax(o_m_l,0)

m_aaa = o_m_l[m_aa[1],:]
```

```python
    o_m_l_t = np.array(o_m_l_t)
    m_aa_t = np.argmax(o_m_l_t,0)

    m_aaa_t = o_m_l_t[m_aa_t[1],:]

    # max for each percent, len
    for i in range(len(max_loc)):
        print(f'\n-----------loading for Dis load len: {round(lii[i],1)}(in)')
        for ii in max_loc[i]:
            print(f'at rear load: {int(ii[0]*100)}% = Max \u03C3:
{round(ii[1],2)}(psi)')
    print(f'\n-------------------\n')

    ni = 0
    # max for each len
    for i in o_m_l:
        print(f'max at len: {round(lii[ni],1)}(in), rear load: {int(i[0]*100)}%,
\u03C3 = {round(i[1], 2)}(psi)')
        ni +=1

    print(f'\n-------------------\noverall max at len(in): {round(lii[m_aa[1]],
2)}, rear load: {int(m_aaa[0]*100)}%,  \u03C3 = {round(m_aaa[1], 2)}(psi)')
    # max for each percent, len
    print(f'\n\n-------------------\ntrailer\n-------------------\n')
    for i in range(len(max_loc_t)):
        print(f'\n-----------loading for Dis load len: {round(lii[i],1)}(in)')
        for ii in max_loc_t[i]:
            print(f'at rear load: {int(ii[0]*100)}% = Max \u03C3:
{round(ii[1],2)}(psi)')
    print(f'\n-------------------\n')

    ni = 0
    # max for each len
    for i in o_m_l_t:
        print(f'max at len: {round(lii[ni],1)}(in), rear load: {int(i[0]*100)}%,
\u03C3 = {round(i[1], 2)}(psi)')
        ni +=1
    print(f'\n-------------------\noverall max at len(in):
{round(lii[m_aa_t[1]], 2)}, rear load: {int(m_aaa_t[0]*100)}%,  \u03C3 =
{round(m_aaa_t[1], 2)}(psi)')
```

Out[5]:

```
-----------loading for Dis load len: 10.0(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 77466.55(psi)
at rear load: 70% = Max σ: 58081.09(psi)
at rear load: 80% = Max σ: 38695.62(psi)
at rear load: 89% = Max σ: 19310.16(psi)

-----------loading for Dis load len: 17.9(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 77466.55(psi)
at rear load: 70% = Max σ: 58081.09(psi)
at rear load: 80% = Max σ: 38695.62(psi)
at rear load: 89% = Max σ: 19310.16(psi)

-----------loading for Dis load len: 25.7(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 77466.55(psi)
at rear load: 70% = Max σ: 58081.09(psi)
at rear load: 80% = Max σ: 38695.62(psi)
at rear load: 89% = Max σ: 19310.16(psi)

-----------loading for Dis load len: 33.6(in)
```

```
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
                at rear load: 70% = Max σ: 58081.09(psi)
                at rear load: 80% = Max σ: 38695.62(psi)
                at rear load: 89% = Max σ: 19310.16(psi)

            ------------loading for Dis load len: 41.4(in)
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
                at rear load: 70% = Max σ: 58081.09(psi)
                at rear load: 80% = Max σ: 38695.62(psi)
                at rear load: 89% = Max σ: 19310.16(psi)

            ------------loading for Dis load len: 49.3(in)
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
                at rear load: 70% = Max σ: 58081.09(psi)
                at rear load: 80% = Max σ: 38695.62(psi)
                at rear load: 89% = Max σ: 19310.16(psi)

            ------------loading for Dis load len: 57.1(in)
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
                at rear load: 70% = Max σ: 58081.09(psi)
                at rear load: 80% = Max σ: 38695.62(psi)
                at rear load: 89% = Max σ: 19310.16(psi)

            ------------loading for Dis load len: 65.0(in)
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
                at rear load: 70% = Max σ: 58081.09(psi)
                at rear load: 80% = Max σ: 38695.62(psi)
                at rear load: 89% = Max σ: 19310.16(psi)

            ------------loading for Dis load len: 72.9(in)
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
                at rear load: 70% = Max σ: 58081.09(psi)
                at rear load: 80% = Max σ: 38695.62(psi)
                at rear load: 89% = Max σ: 19310.16(psi)

            ------------loading for Dis load len: 80.7(in)
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
                at rear load: 70% = Max σ: 58081.09(psi)
                at rear load: 80% = Max σ: 38695.62(psi)
                at rear load: 89% = Max σ: 19310.16(psi)

            ------------loading for Dis load len: 88.6(in)
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
                at rear load: 70% = Max σ: 58081.09(psi)
                at rear load: 80% = Max σ: 38695.62(psi)
                at rear load: 89% = Max σ: 19310.16(psi)

            ------------loading for Dis load len: 96.4(in)
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
                at rear load: 70% = Max σ: 58081.09(psi)
                at rear load: 80% = Max σ: 38695.62(psi)
                at rear load: 89% = Max σ: 19310.16(psi)

            ------------loading for Dis load len: 104.3(in)
                at rear load: 0% = Max σ: 0.0(psi)
                at rear load: 60% = Max σ: 77466.55(psi)
```

```
          at rear load: 70% = Max σ: 58081.09(psi)
          at rear load: 80% = Max σ: 38695.62(psi)
          at rear load: 89% = Max σ: 19310.16(psi)

          ------------loading for Dis load len: 112.1(in)
          at rear load: 0% = Max σ: 0.0(psi)
          at rear load: 60% = Max σ: 77466.55(psi)
          at rear load: 70% = Max σ: 58081.09(psi)
          at rear load: 80% = Max σ: 38695.62(psi)
          at rear load: 89% = Max σ: 19310.16(psi)

          ------------loading for Dis load len: 120.0(in)
          at rear load: 0% = Max σ: 0.0(psi)
          at rear load: 60% = Max σ: 77466.55(psi)
          at rear load: 70% = Max σ: 58081.09(psi)
          at rear load: 80% = Max σ: 38695.62(psi)
          at rear load: 89% = Max σ: 19310.16(psi)

          --------------------

          max at len: 10.0(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 17.9(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 25.7(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 33.6(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 41.4(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 49.3(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 57.1(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 65.0(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 72.9(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 80.7(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 88.6(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 96.4(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 104.3(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 112.1(in), rear load: 60%, σ = 77466.55(psi)
          max at len: 120.0(in), rear load: 60%, σ = 77466.55(psi)

          --------------------
          overall max at len(in): 10.0, rear load: 60%,  σ = 77466.55(psi)

          --------------------
          trailer
          --------------------

          ------------loading for Dis load len: 10.0(in)
          at rear load: 0% = Max σ: 0.0(psi)
          at rear load: 60% = Max σ: 3895.68(psi)
          at rear load: 70% = Max σ: 21899.88(psi)
          at rear load: 80% = Max σ: 31365.27(psi)
          at rear load: 89% = Max σ: 25683.56(psi)

          ------------loading for Dis load len: 17.9(in)
          at rear load: 0% = Max σ: 0.0(psi)
          at rear load: 60% = Max σ: 5430.46(psi)
          at rear load: 70% = Max σ: 20706.53(psi)
          at rear load: 80% = Max σ: 29738.13(psi)
          at rear load: 89% = Max σ: 24246.18(psi)

          ------------loading for Dis load len: 25.7(in)
          at rear load: 0% = Max σ: 0.0(psi)
          at rear load: 60% = Max σ: 7038.65(psi)
          at rear load: 70% = Max σ: 19641.22(psi)
          at rear load: 80% = Max σ: 28115.32(psi)
          at rear load: 89% = Max σ: 22990.01(psi)
```

```
------------loading for Dis load len: 33.6(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 8668.7(psi)
at rear load: 70% = Max σ: 18496.58(psi)
at rear load: 80% = Max σ: 26497.4(psi)
at rear load: 89% = Max σ: 21619.43(psi)


------------loading for Dis load len: 41.4(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 10308.17(psi)
at rear load: 70% = Max σ: 17317.74(psi)
at rear load: 80% = Max σ: 24865.46(psi)
at rear load: 89% = Max σ: 20294.03(psi)


------------loading for Dis load len: 49.3(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 11952.56(psi)
at rear load: 70% = Max σ: 16186.75(psi)
at rear load: 80% = Max σ: 23226.2(psi)
at rear load: 89% = Max σ: 18948.04(psi)


------------loading for Dis load len: 57.1(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 13599.84(psi)
at rear load: 70% = Max σ: 15050.96(psi)
at rear load: 80% = Max σ: 21582.64(psi)
at rear load: 89% = Max σ: 17597.62(psi)


------------loading for Dis load len: 65.0(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 15248.95(psi)
at rear load: 70% = Max σ: 13891.24(psi)
at rear load: 80% = Max σ: 19936.34(psi)
at rear load: 89% = Max σ: 16264.38(psi)


------------loading for Dis load len: 72.9(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 16899.32(psi)
at rear load: 70% = Max σ: 12732.21(psi)
at rear load: 80% = Max σ: 18288.19(psi)
at rear load: 89% = Max σ: 14901.06(psi)


------------loading for Dis load len: 80.7(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 18550.56(psi)
at rear load: 70% = Max σ: 11600.1(psi)
at rear load: 80% = Max σ: 16638.72(psi)
at rear load: 89% = Max σ: 13575.62(psi)


------------loading for Dis load len: 88.6(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 20202.46(psi)
at rear load: 70% = Max σ: 10449.78(psi)
at rear load: 80% = Max σ: 14988.3(psi)
at rear load: 89% = Max σ: 12211.36(psi)


------------loading for Dis load len: 96.4(in)
at rear load: 0% = Max σ: 0.0(psi)
at rear load: 60% = Max σ: 21854.84(psi)
at rear load: 70% = Max σ: 9285.69(psi)
at rear load: 80% = Max σ: 13337.14(psi)
at rear load: 89% = Max σ: 10884.26(psi)


------------loading for Dis load len: 104.3(in)
```

```
            at rear load: 0% = Max σ: 0.0(psi)
            at rear load: 60% = Max σ: 23507.6(psi)
            at rear load: 70% = Max σ: 9472.84(psi)
            at rear load: 80% = Max σ: 11685.42(psi)
            at rear load: 89% = Max σ: 9530.31(psi)

            -----------loading for Dis load len: 112.1(in)
            at rear load: 0% = Max σ: 0.0(psi)
            at rear load: 60% = Max σ: 25160.66(psi)
            at rear load: 70% = Max σ: 10946.38(psi)
            at rear load: 80% = Max σ: 10033.26(psi)
            at rear load: 89% = Max σ: 8191.38(psi)

            -----------loading for Dis load len: 120.0(in)
            at rear load: 0% = Max σ: 0.0(psi)
            at rear load: 60% = Max σ: 26813.96(psi)
            at rear load: 70% = Max σ: 12443.66(psi)
            at rear load: 80% = Max σ: 8380.74(psi)
            at rear load: 89% = Max σ: 9490.25(psi)

            --------------------

            max at len: 10.0(in), rear load: 80%, σ = 31365.27(psi)
            max at len: 17.9(in), rear load: 80%, σ = 29738.13(psi)
            max at len: 25.7(in), rear load: 80%, σ = 28115.32(psi)
            max at len: 33.6(in), rear load: 80%, σ = 26497.4(psi)
            max at len: 41.4(in), rear load: 80%, σ = 24865.46(psi)
            max at len: 49.3(in), rear load: 80%, σ = 23226.2(psi)
            max at len: 57.1(in), rear load: 80%, σ = 21582.64(psi)
            max at len: 65.0(in), rear load: 80%, σ = 19936.34(psi)
            max at len: 72.9(in), rear load: 80%, σ = 18288.19(psi)
            max at len: 80.7(in), rear load: 60%, σ = 18550.56(psi)
            max at len: 88.6(in), rear load: 60%, σ = 20202.46(psi)
            max at len: 96.4(in), rear load: 60%, σ = 21854.84(psi)
            max at len: 104.3(in), rear load: 60%, σ = 23507.6(psi)
            max at len: 112.1(in), rear load: 60%, σ = 25160.66(psi)
            max at len: 120.0(in), rear load: 60%, σ = 26813.96(psi)

            --------------------
            overall max at len(in): 10.0, rear load: 80%,  σ = 31365.27(psi)
```

In [6]:
```python
# SFD BMD, \u03C3 vs distance for each condition of len,percent

for ii in range(len(m_full)):
    fig, ax = plt.subplots(1,1)
    m_half_2 = m_full[ii]
    m_half = m_half_2[len(m_half_2)//2]

    ax.plot(xx,m_half[0])
    ax.plot(xx,m_half[1]*1e-2)
    ax.plot(xx,m_half[2]*1e-1)

    ax.legend(['Shear (lb)', 'Moment(100*lb*in)', 'Sigma (10*psi)'])
    fig.suptitle(f'Plots for len of load: {round(lii[ii],2)}(in)')
    ax.set_title('SFD BMD, \u03C3 allong trailer(in) for current loading')
    fig.show()

# init plots
title = ['\u03C3(psi) vs percentage rear load at max condition: for meadian
length load', '\u03C3(psi) vs length load(in): for  median percent rear
load']

fig, ax = plt.subplots(1,2)
#for same loc
```

```
ax[0].plot(max_loc[7][:,0], max_loc[7][:,1])

# for same per
ax[1].plot(lii,[i[i.shape[0]//2,1] for i in max_loc])

# for readbility
fig.suptitle('overall plots')
for iii in range(2):
    ax[iii].grid(True)
    ax[iii].set_title(title[iii])
fig.show()
```

Out[6]:
```
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
```

```
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:15: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
/tmp/ipykernel_821/4095886525.py:32: UserWarning: Matplotlib is currently
using module://matplotlib_inline.backend_inline, which is a non-GUI backend,
so cannot show the figure.
  fig.show()
```
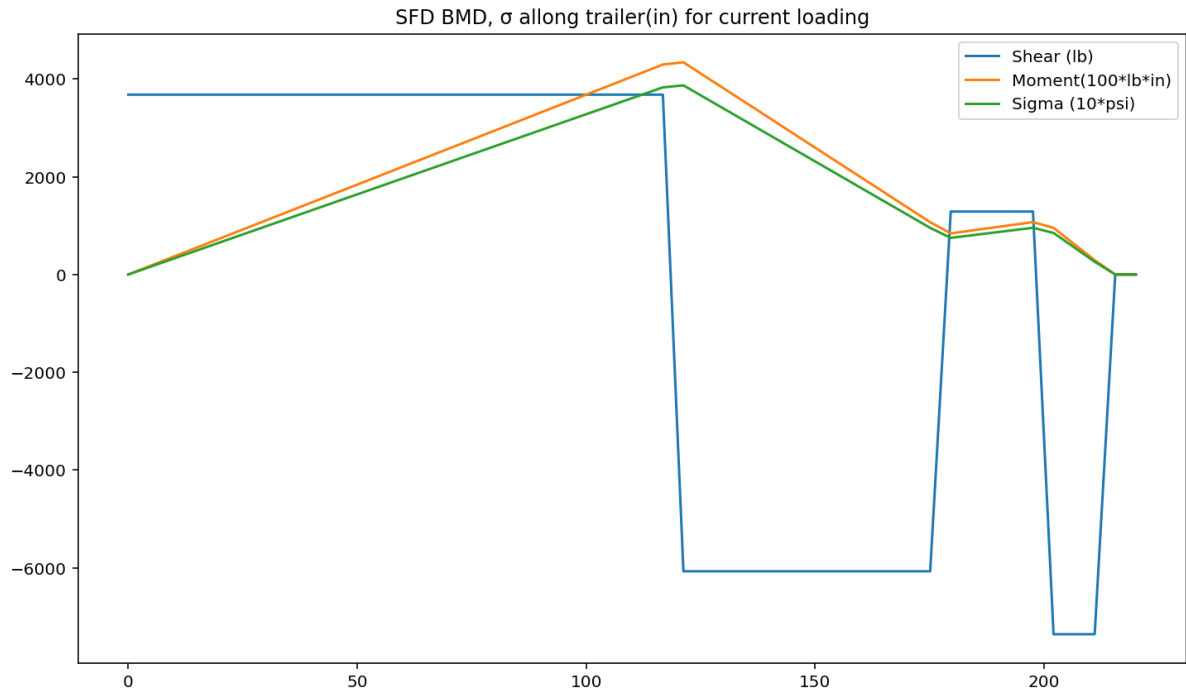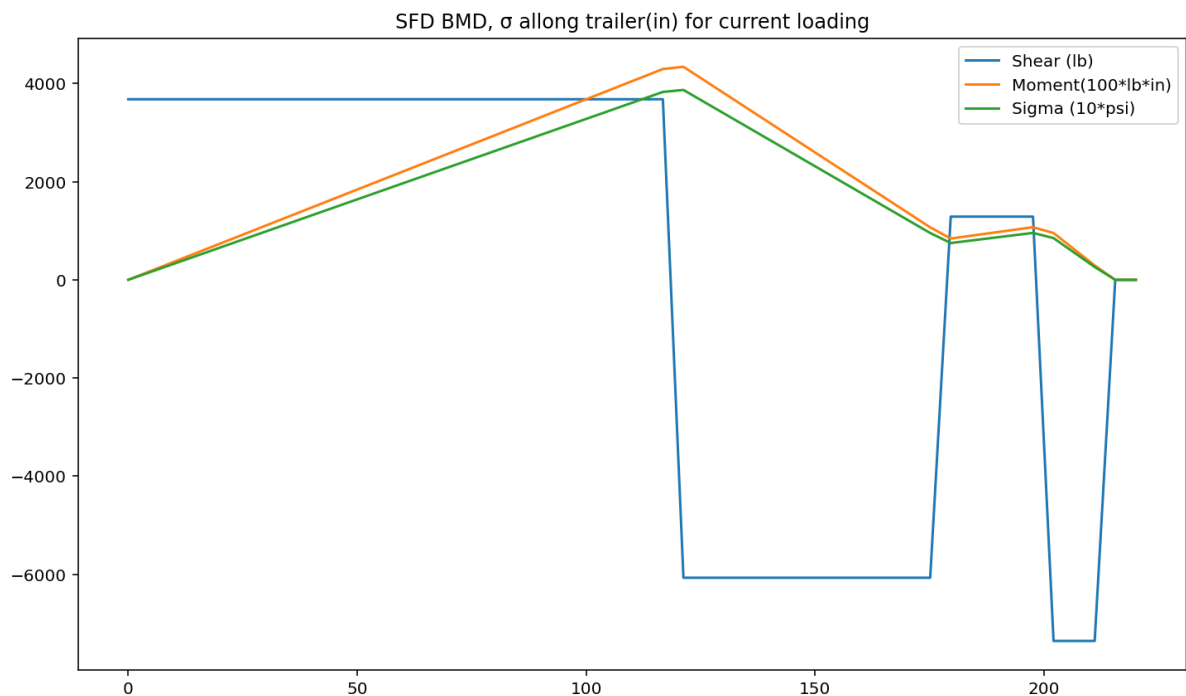
Plots for len of load: 10.0(in)

SFD BMD, σ allong trailer(in) for current loading

Plots for len of load: 17.86(in)

SFD BMD, σ allong trailer(in) for current loading

Plots for len of load: 25.71(in)

SFD BMD, σ allong trailer(in) for current loading
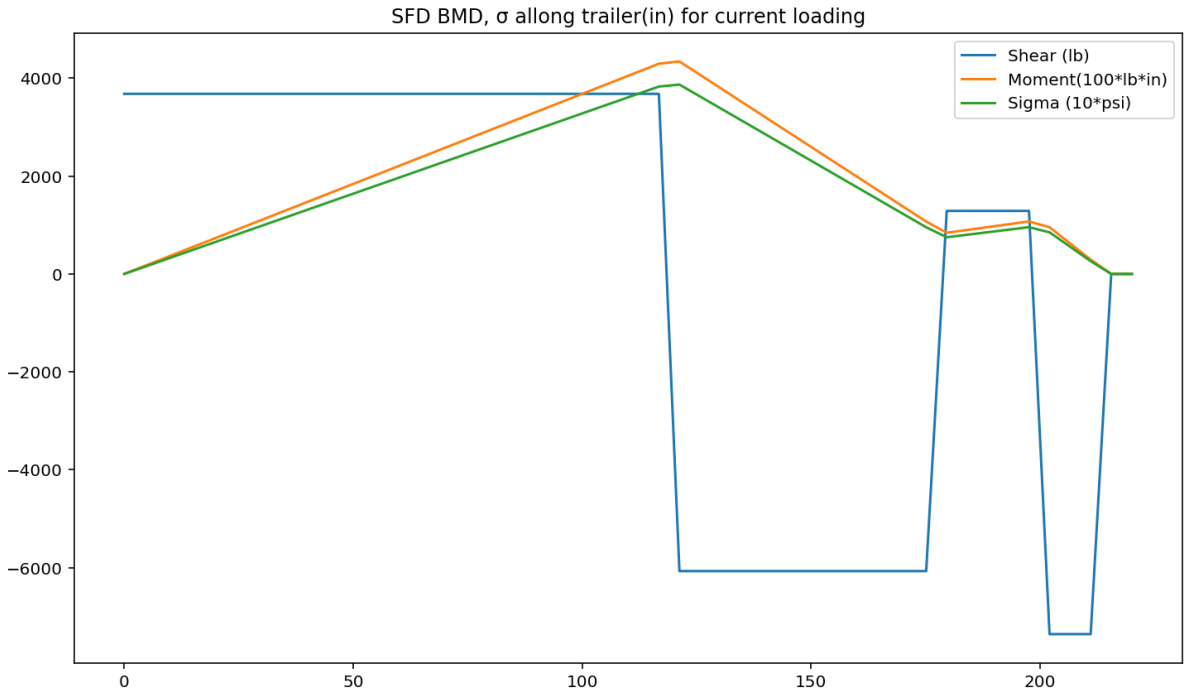
Plots for len of load: 33.57(in)

SFD BMD, σ allong trailer(in) for current loading

Plots for len of load: 41.43(in)

SFD BMD, σ allong trailer(in) for current loading

Plots for len of load: 49.29(in)

SFD BMD, σ allong trailer(in) for current loading
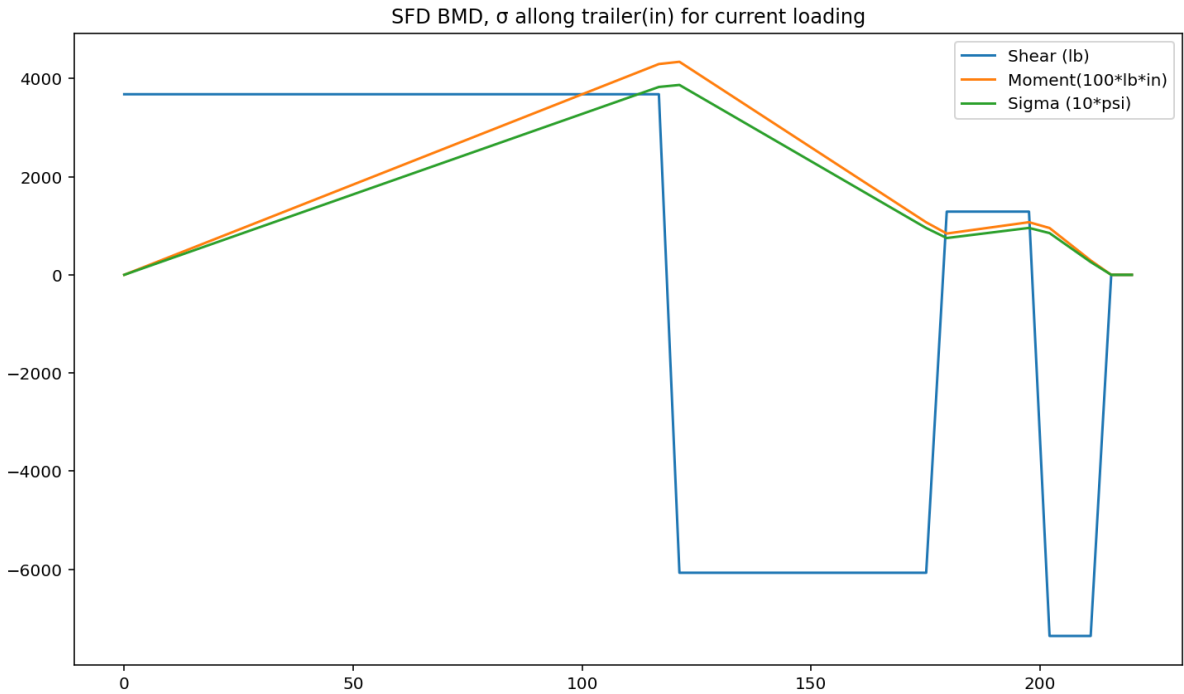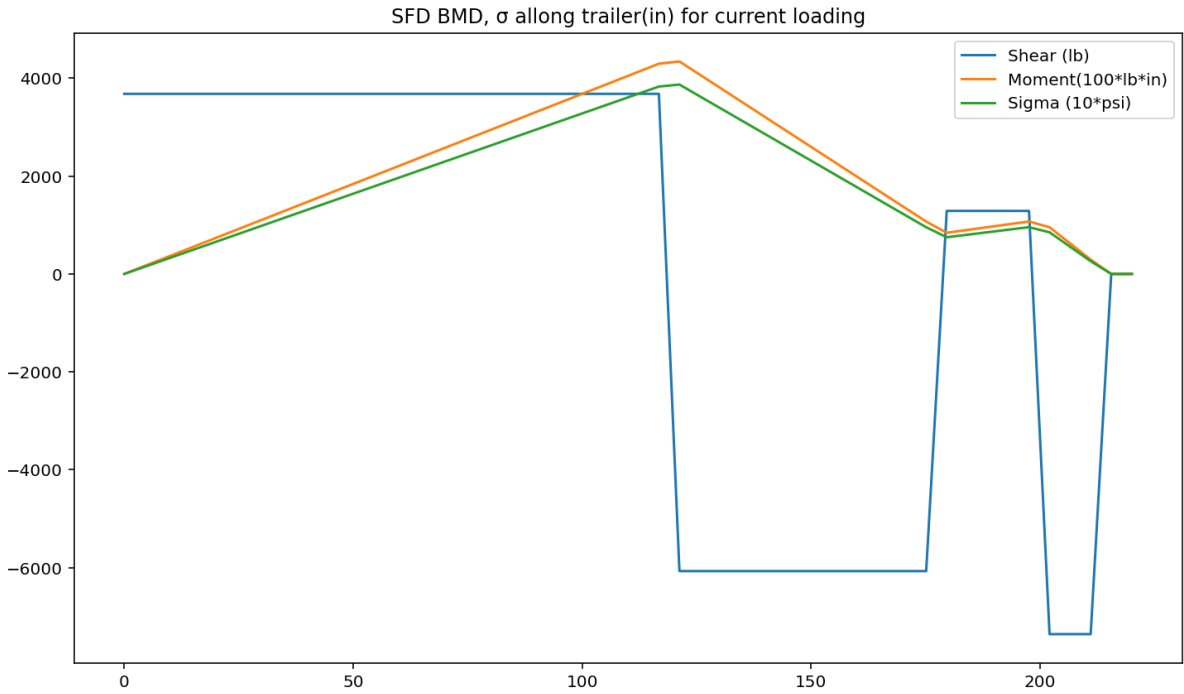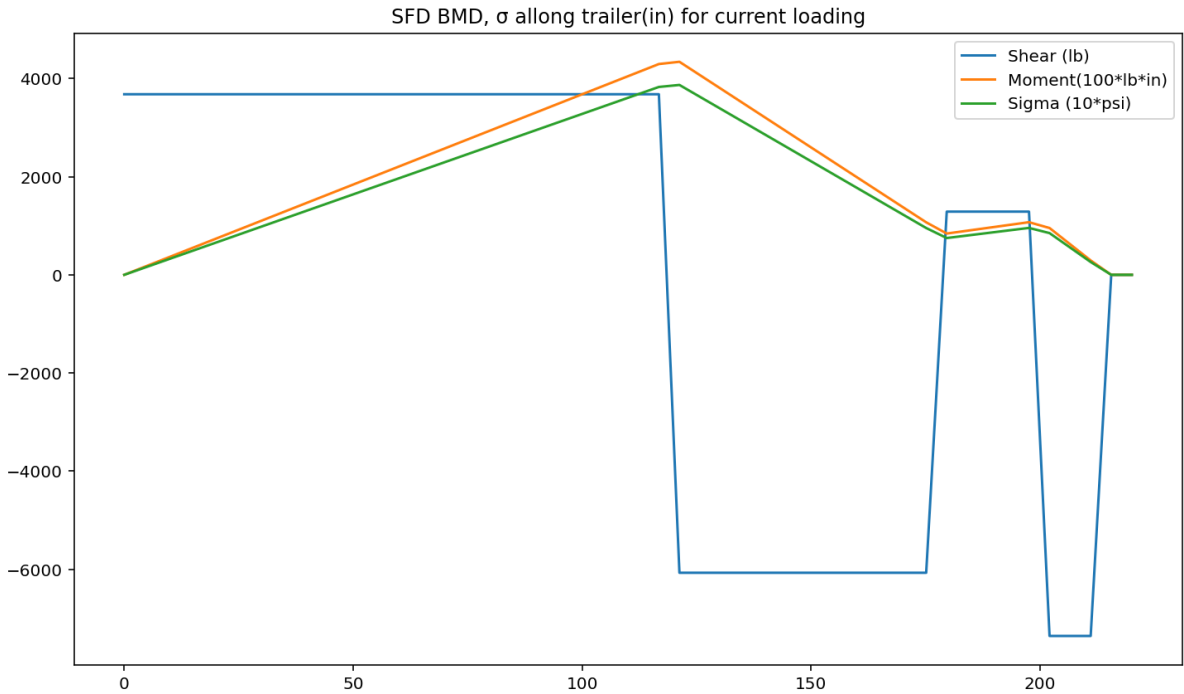
Plots for len of load: 57.14(in)

SFD BMD, σ allong trailer(in) for current loading

Plots for len of load: 65.0(in)

SFD BMD, σ allong trailer(in) for current loading
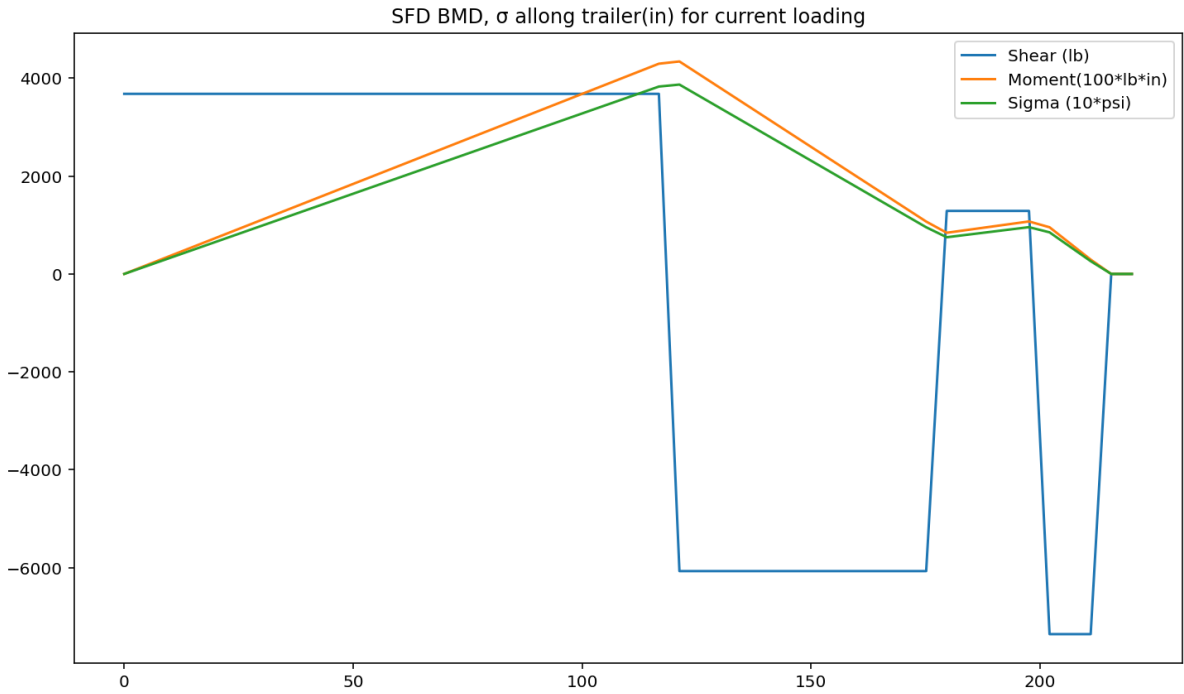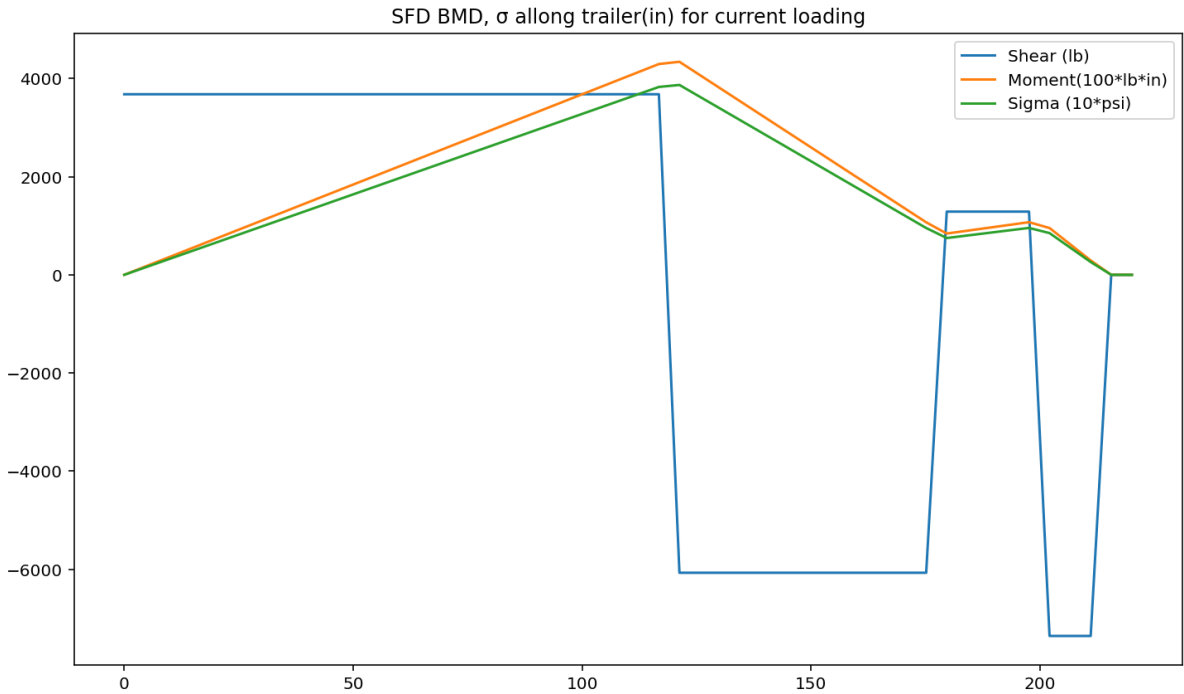
Plots for len of load: 72.86(in)

SFD BMD, σ allong trailer(in) for current loading

Plots for len of load: 80.71(in)

SFD BMD, σ allong trailer(in) for current loading

Plots for len of load: 88.57(in)

SFD BMD, σ allong trailer(in) for current loading
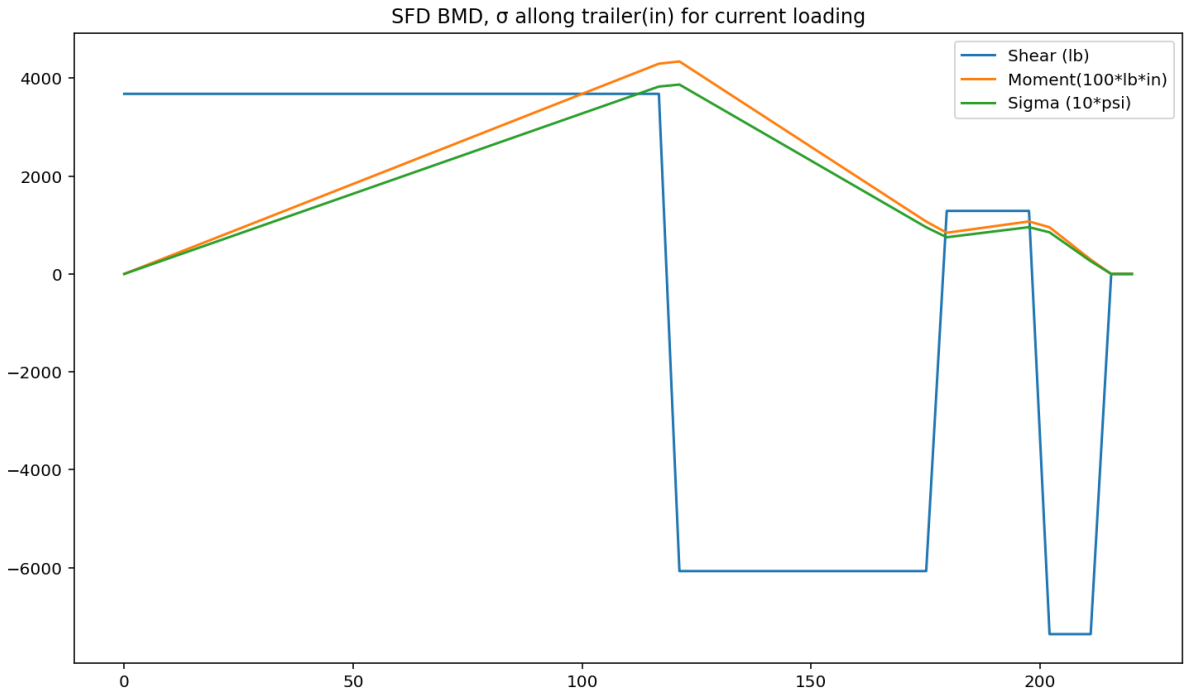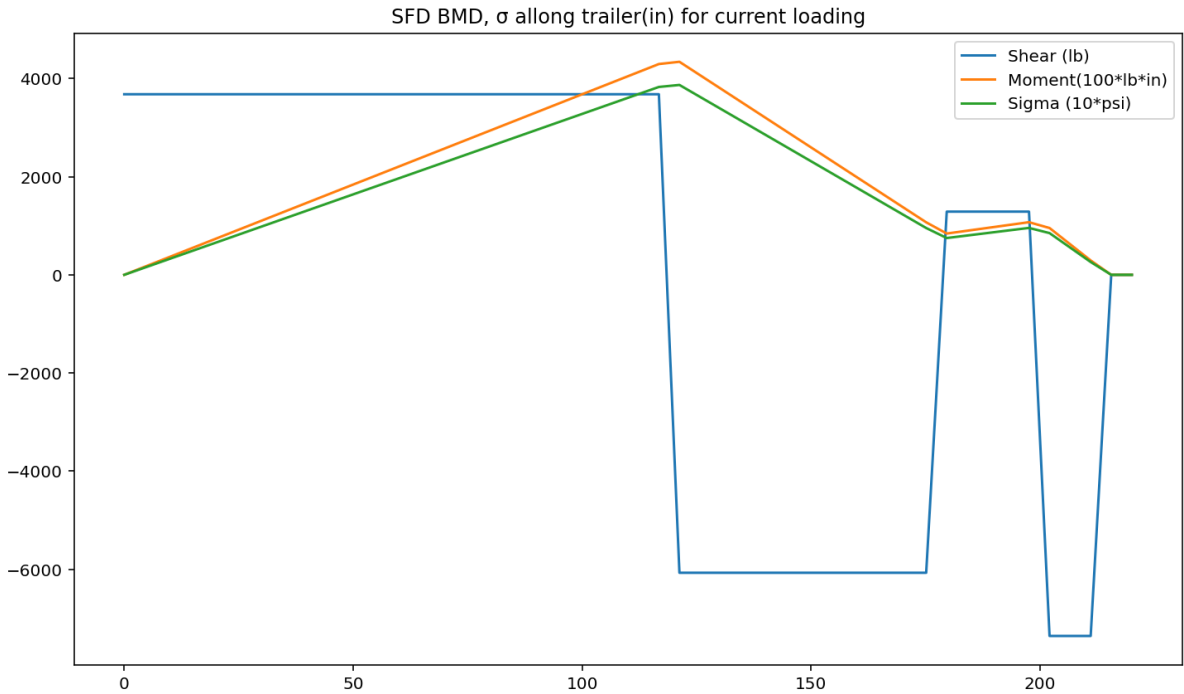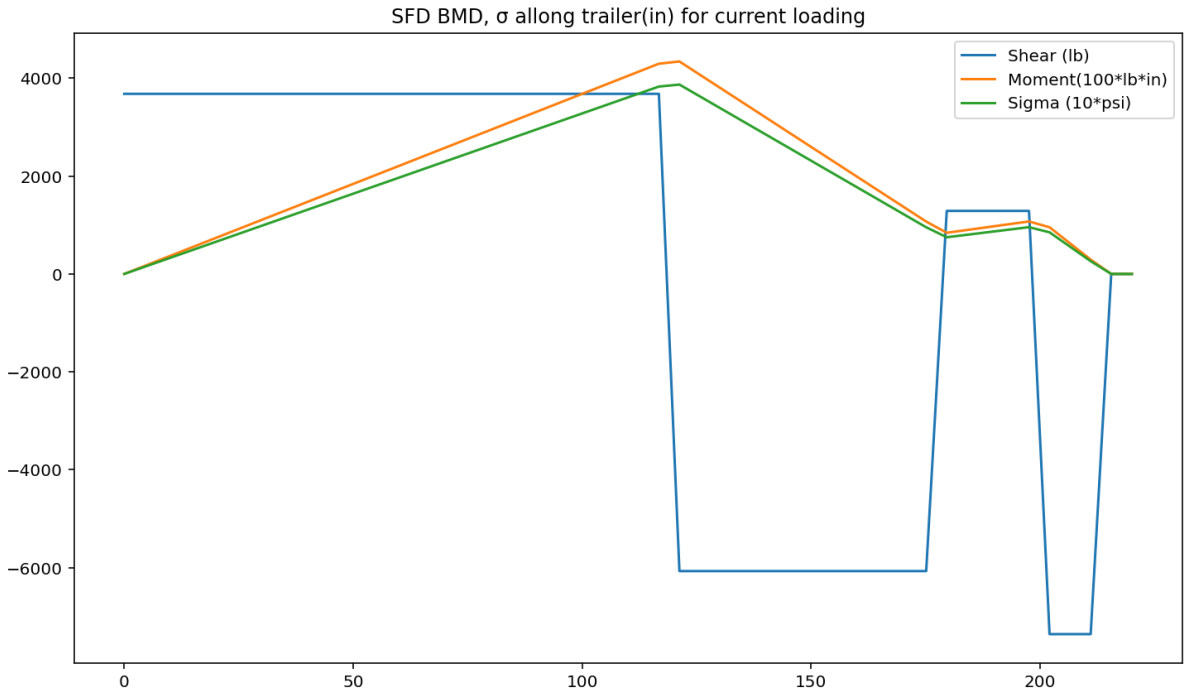
Plots for len of load: 96.43(in)

SFD BMD, σ allong trailer(in) for current loading

Plots for len of load: 104.29(in)

SFD BMD, σ allong trailer(in) for current loading
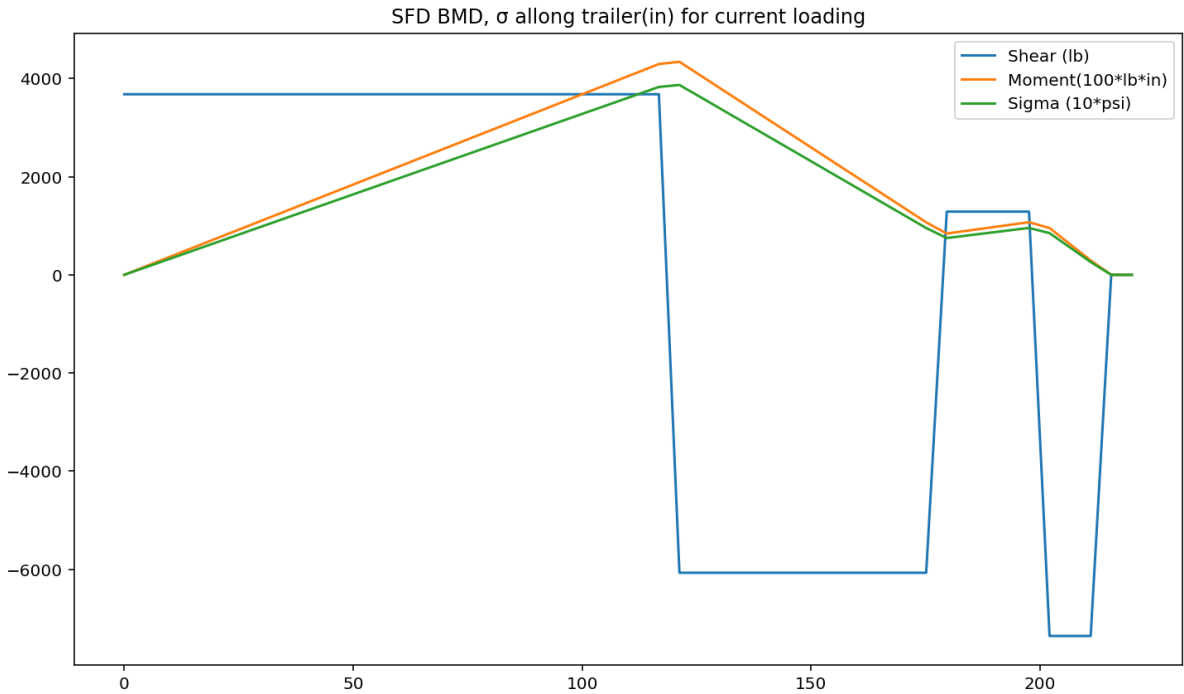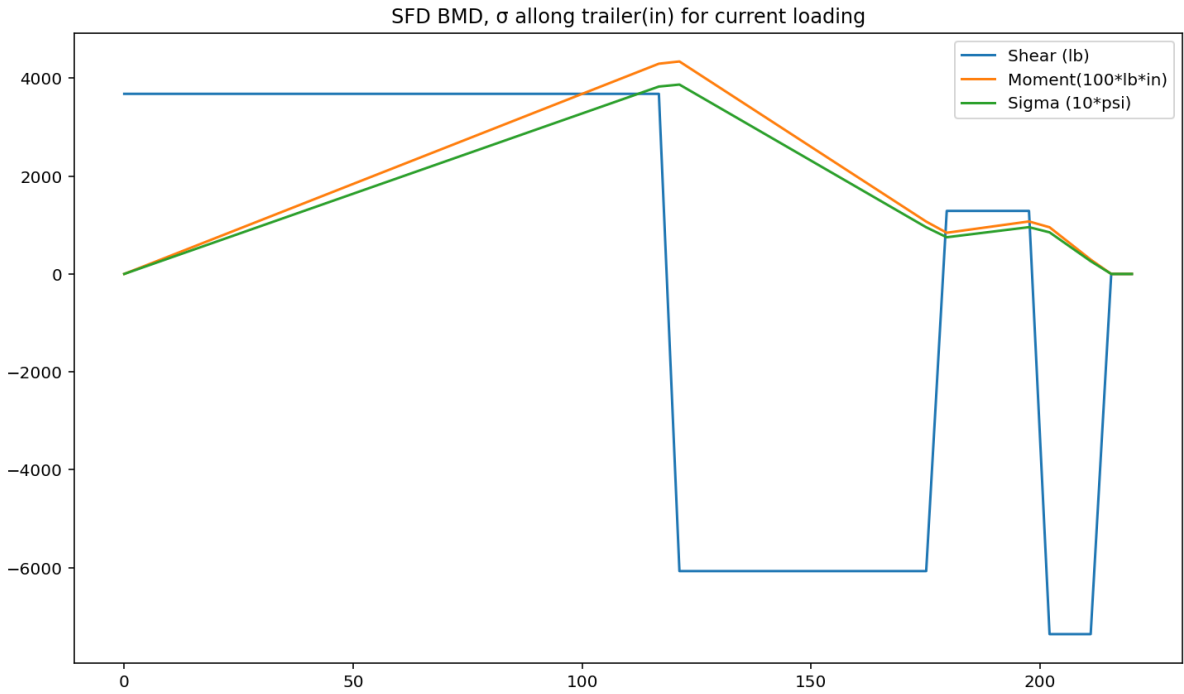
Plots for len of load: 112.14(in)
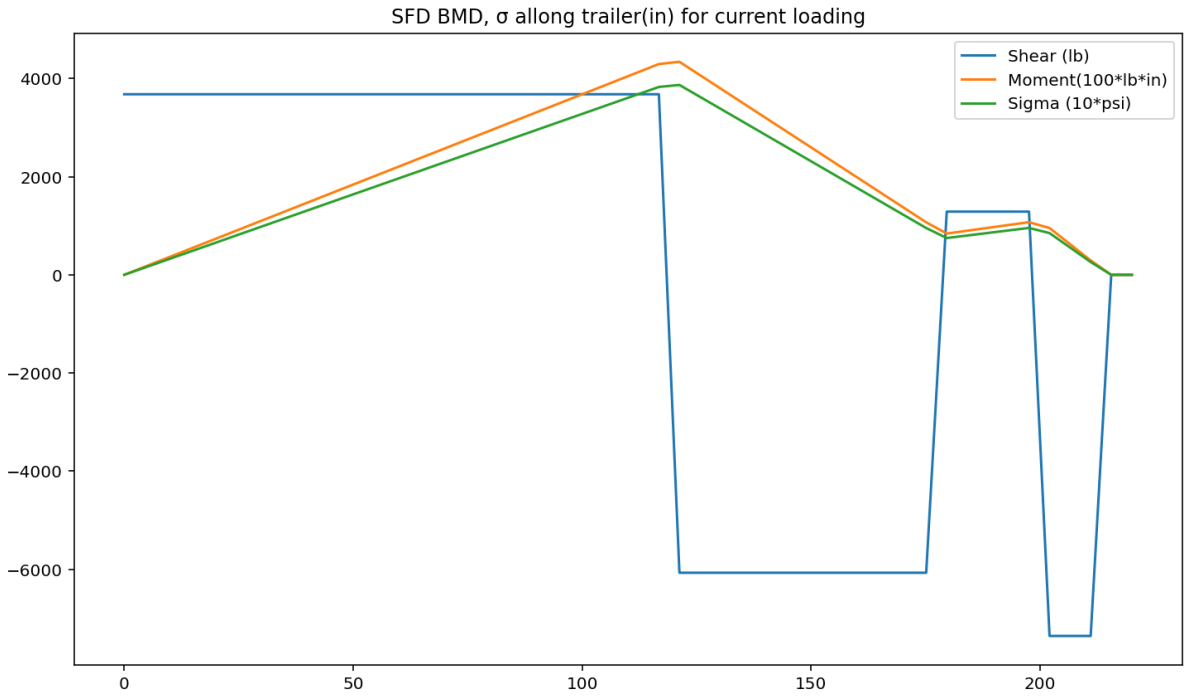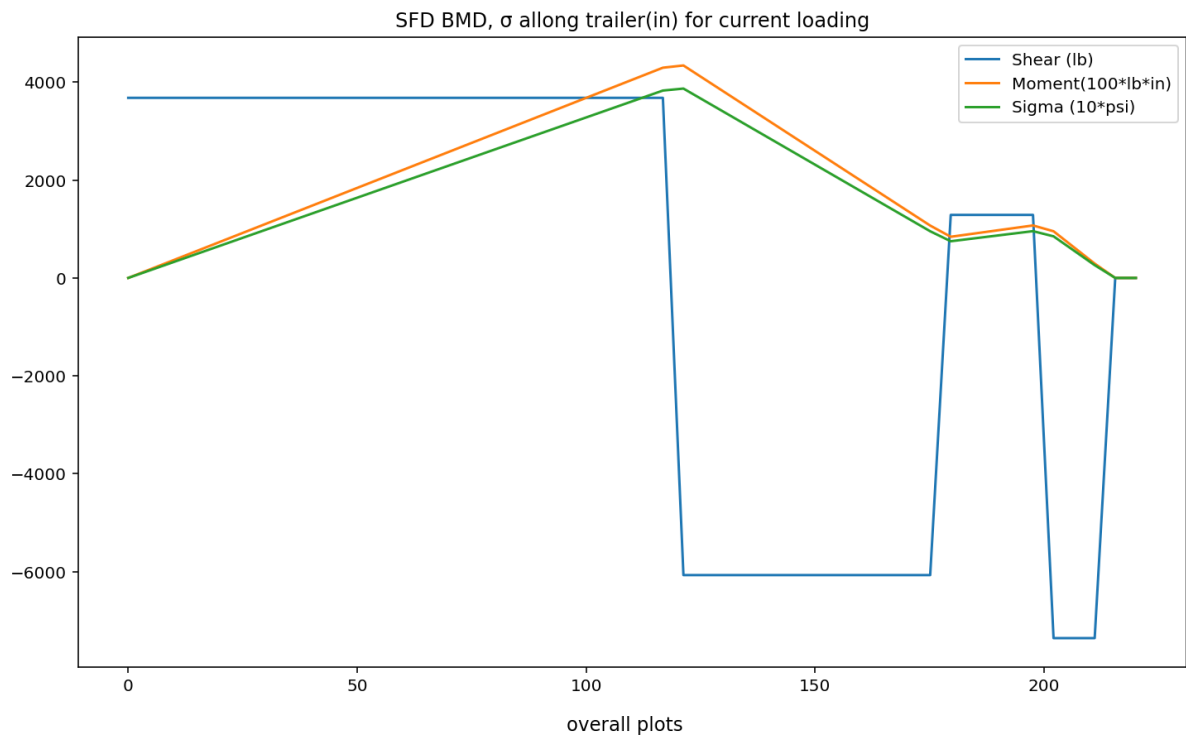
SFD BMD, σ allong trailer(in) for current loading

Plots for len of load: 120.0(in)

SFD BMD, σ allong trailer(in) for current loading

overall plots

σ(psi) vs percentage rear load at max condition: for meadian length load σ(psi) vs length load(in): for median percent rear load
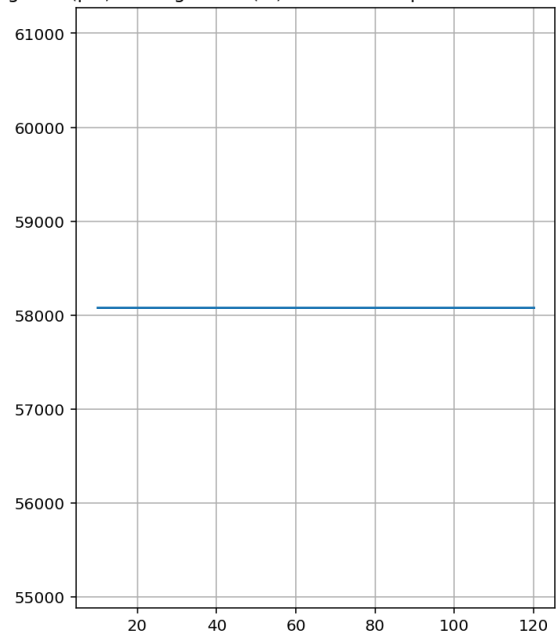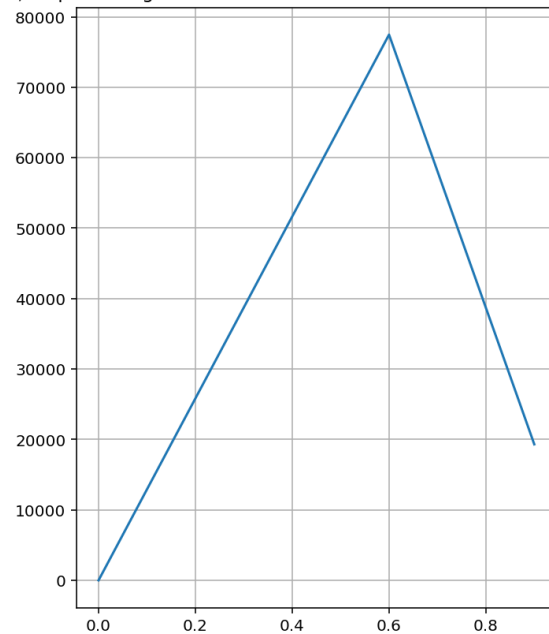
In [7]:
```
for i in lii:
    print(i/400)
```

Out[7]: 0.025
0.044642857142857144
0.0642857142857143
0.08392857142857142
0.10357142857142858
0.1232142857142857
0.14285714285714285
0.1625
0.18214285714285716
0.20178571428571426

```
        0.22142857142857142
        0.24107142857142858
        0.2607142857142857
        0.28035714285714286
        0.3
```

In [8]:
```
lx(0,15,215)
```

Out[8]: `array([0.])`

In [9]:
```
tp =np.arange(0,220)
tx = lx(0,15,tp)
plt.plot(tp,tx)
tx
```

Out[9］:
```
array([-257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
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       -257600., -257600., -257600., -257600., -257600., -257600.,
       -257600., -257600., -257600., -257600., -257600., -257600.,
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        376050.,  376050.,  376050.,  376050.,  376050.,  376050.,
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        376050.,  376050.,  376050.,  376050.,  376050.,  514050.,
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        514050.,  514050.,  514050.,  514050.,  514050.,  514050.,
        514050.,  514050., -138000., -138000., -138000., -138000.,
       -138000., -138000., -138000., -138000., -138000., -138000.,
       -138000., -138000., -138000., -138000., -138000.,       0.,
             0.,       0.,       0.,       0.])
```
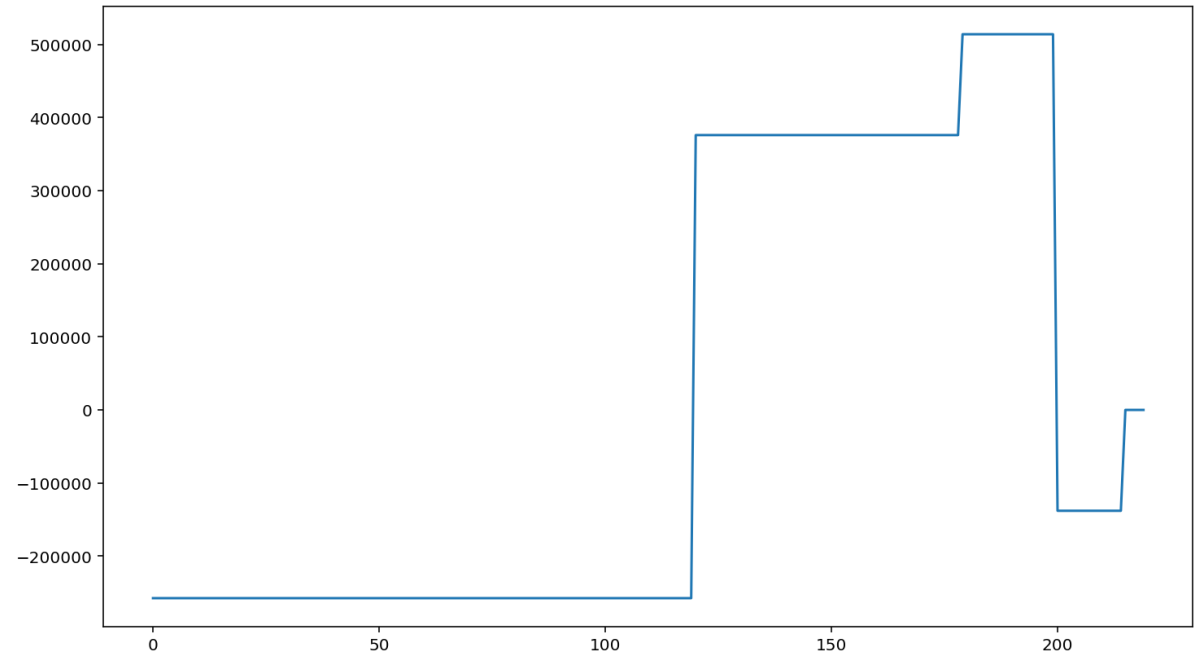
In [0]: