**EE 491 WEEKLY REPORT** **Date: 04/10/2017**

**Group number:** Dec1702B

**Project title:** Re-Conductor or New Construction Transmission Line

**Client:** Musctine Power and Water

**Advisor:** Anne Kimber

**Team Members & Role:** 1. Bob Cohoon (Team Leader)
2. Abdelmagieed Ibrahim (Kay Concept Holder)
3. Jinan Li (Web Master)
4. Chang Sun (Communication Leader)

## Weekly Summary

For this week, we worked on the line impedance and seg calculations. In order to calculate all the parameters of conductors systematically, we wrote scripts to perform automatic calculations for all types of conductors.

The final presentation is around the corner, we have divided our works on preparing for the final presentation for next week.

Since our advisor Anne is not available for meeting, we had a group meeting to exchange developments of calculation scripts and distributed the work for next week.

## Past week accomplishments

**Robert Cohoon:**
- Did calculation for line impedance of $T_2$
- Did calculation for seg of $T_2$

**Abdelmagieed Ibrahim:**
- Did calculation for line impedance of AAAC
- Did calculation for seg of AAAC

**Jinan Li:**
- Did calculation for line impedance of ACSR
- Did calculation for seg of ACSR

**Chang Sun:**
- Did calculation for line impedance of ACSS
- Did calculation for seg of ACSS

## Pending issues

**Bob Cohoon:** NA

**Abdelmagieed Ibrahim:** NA

**Jinan Li:** NA

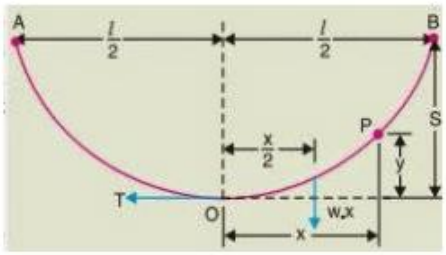
**Chang Sun:** NA

**Individual contributions**

| NAME | Individual Contributions | Hours this week | Hours cumulative |
|---|---|---|---|
| Robert Cohoon | Research on T2 conductors | 20 | 80 |
| Abdelmagieed Ibrahim | Attend group meeting; Did research on AAAC conductors | 10 | 93 |
| Jinan Li | Attend group meeting; Did research on ACSR conductors | 15 | 80 |
| Chang Sun | Attend group meeting; Did research on ACSS conductors | 10 | 90 |

**Comments and extended discussion**

For the seg and tension of the transmission line, we did detailed research and found the definition and the equations for manual calculation:




Equating the moments of above two forces about point O, we get,

$$Ty = wx \times \frac{x}{2}$$

$$y = \frac{w x^2}{2T}$$

The maximum dip (**sag**) is represented by the value of y at either of the supports A and B. At support A, x = l/2 and y = S.

$$\text{Sag, } S = \frac{w(l/2)^2}{2T} = \frac{w l^2}{8T}$$

We also developed two MATLAB scripts to calculate the line impedance and segment of the transmission line.

For line impedance:

```
% AAAC
% R/1000FT(25C)          R/1000FT(75C)            GMR
%   0.0226                  0.0263               0.0354
% Deq= (Dab*Dbc*Dca)^1/3
%z= r+j0.1213 ln(Deq/GMR)
%
% distance in feet
prompt = 'what is virtical clearance between phases in feet  ';
A= input(prompt);
prompt = 'what is length of insulator in feet ' ;
B= input(prompt);

Dab = sqrt((A^2)+((2*B)^2));
Dbc= Dab;
Dac=2*A;
Deq= (Dab*Dbc*Dac)^(1/3);
prompt = 'what is the resistance (ohm per mile) for the conductor?  ';
r = input(prompt);                    % Resistance (ohm/mile)
prompt = ' what is the GMR of the conductor ';
GMR = input(prompt);
x= Deq/GMR;
Y=log(x);
display('line impedance i (ohm/mile) is:')
z=(r+i*Y)
```

For segment:

```
%%
% sag calculation
% AAAC (ALL ALUMINUM-ALLOY CONDUCTOR)
%word code      size      Diameter     Weight/length      Rated strength
%              (kcmil)     (ins.)          (lbs/ft)             (lbs)
%Greeley        927.2       1.108          0.8646              30500

%H= 20% of rated strength (WHY????)
prompt = 'what is the rated strength for the conductor (lbs.) ' ;
T = input(prompt);
H = 0.2*T;      % 20% of rated strength

prompt = 'what is weight per unit length for the conductor (lbs./ft.) ' ;
w= input(prompt);
prompt = 'what is the span length  (feet) ' ;  % Span length, in ft.( for 69kv 350-400)
l = input(prompt);
display('The Sag is :')
Sag= w*l*l/(8*H)
display('The Slag is')
Slag = (w^2 *l^3)/(24*H^2)       %


%% SAG at high Temp
%When a conductor undergoes thermal elongation, the length L of the cable increases while
%the span l remains the same. This results in a decrease in tension in the conductor. So, to
%and the sag distance of a hot conductor, we must consider both thermal expansion and strain
%under tension. The tension of a conductor and the temperature at which the cable was strung
%will be known or speciaed. To and the sag, you must and a tension H at which the length of
%the elongated cable is equal to the catenary cable's length
```

## Plan for coming week

- **Robert Cohoon:** • Prepare for the final presentation
- **Abdelmagieed Ibrahim:** • Prepare for the final presentation
- **Jinan Li:** • Prepare for the final presentation
- **Chang Sun:** • Prepare for the final presentation
  • Keep up all the materials with our client
  • Keep up all the material with our advisor, Dr, Ajjarapu

**Summary of weekly advisor meeting**

For this week, our advisor Anne is not available for our regular meeting time, hence we did not have any advisor meeting. But our team met each other and discussed about the further movement of the project.

We discussed the line impedance and seg calculations. We wrote and tested the code for calculation and used the scripts for all types of conductors.