

Average No. cars per sub-station.... 1.6

$\sqrt{\frac{\quad}{2}}$
Mean amps. per car 185.3

$\sqrt{\frac{\quad}{2}}$
Mean amps. per sub-station
= m279.0

With sub-stations 12 miles
apart, 80 lbs. track rail
and 60 lbs. 3rd rail, re-
sistance between ad-
jacent sub-stations is
= r 0.9 ohms.

D.C. line loss per sub-sta-
tion r_{m2} =..... 16.1 K.W.

Average K.W. per sub sta-
tion at cars = 67.2×1.6
=107.5

Average K.W. per sub-
station at sub-station....123.6 K.W.

% loss in 3rd rail 15.5 %

% loss in step-down trans-
formers 3.5 %

% loss in high tension line 2.5 %

% loss in step-up trans-
formers 3.5 %

Total % loss from cars to
P.H. 39.5 %

Average K.W. consumed
by 8 cars at the cars.537 K.W.

Average K.W. at power
house for 8 cars750 K.W.

Max. load per sub-station
— worst condition — 2
cars starting 560 K.W.

One 400-K.W. rotor will
take care of this 40 %
overload.

Average load on rotary... 30 %

Rotary sub-stations are of
sufficient size so that one
can be cut out tem-
porarily.

Maximum load on P.H.,
say.....1,200 K.W.

Average No. cars per sub-
station..... 1.6

$\sqrt{\frac{\quad}{2}}$
Mean apparent K.W. per
car.....129.0

$\sqrt{\frac{\quad}{2}}$
Mean amps per car (3,000
volts) 43.0

$\sqrt{\frac{\quad}{2}}$
Mean amps per sub-station
= m 68.8

With sub-stations 12 miles
apart, 80lbs. track rail
and No. 0000 trolley,
resistance between sub-
stations allowing for in-
creased rail resistance... 4.2 ohms.

Trolley and rail loss per
sub-station = r_{m2} = ... 3.32 K.W.

Average real K.W. per
sub-station at cars =
 73.9×1.6 =118.0

Average real K.W. per
sub-station at sub-
station121.32 K.W.

% loss in regulator and car
transformers..... 5 %

% loss in trolley and rails. 2.8 %

% loss in step-down trans-
formers 3.5 %

% loss in high tension line 2.5 %

% loss in step-up trans-
formers..... 3.5 %

Total % loss 18.4 %

Average real K.W. con-
sumed by 8 cars at the
cars.....591 K.W.

Average real K.W. at
power house for 8 cars. 700 K.W.

Average apparent K.W.
at power house, about. 825 K.W.

Max. load per sub-station
— worst condition — 2
cars starting (say 275
apparent K.W. each)...550 K.W.

One 350 K.W. transformer
will take care of this
with 50 % overload.

Average load on sub-
station, about..... 40 %

These transformers are
sufficiently large to take
care of load if one is cut
out.

Max. load on P.H. in
apparent K.W., say.....1,400 K.W.