Details about comparing two surfaces

	A	B
Initial Cost	$500,000	$700,000
Annual Maintenance	35,000	25,000
Periodic Resurfacing	350,000	450,000
Resurfacing Interval	10 years	15 years

The overall present value could be express as:

$$PV(A) = Initial\ Cost + A_1(P/A, n, 12\%) + A_2(P/A, n, 12\%) \tag{1}$$

Where A_1 is the Annual maintenance fee and A_2 is the equivalent fee of annual resurfacing, n is the predicted using years.

A_2 could be solved by using:

$$\begin{aligned} 350000(P/F, 10, 12\%) &= A_2(P/A, 10, 12\%) \\ \Longrightarrow A_2 &= \$19944.46 \end{aligned} \tag{2}$$

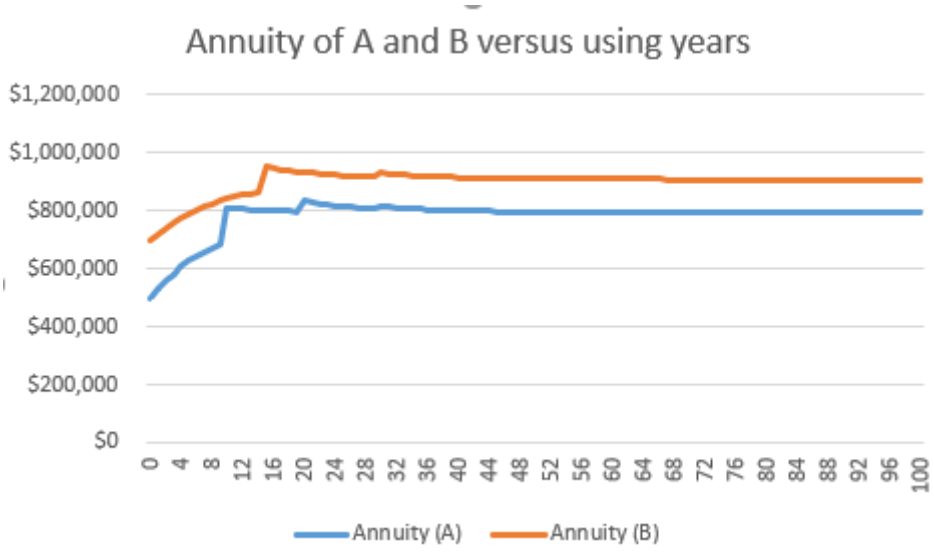
Plugging variables into equation 1 and we get annuity of A is a function of years:

$$A_{PV}(A) = 500000 + 35000(P/A, n, 12\%) + 19944.46(P/A, n, 12\%) \tag{3}$$

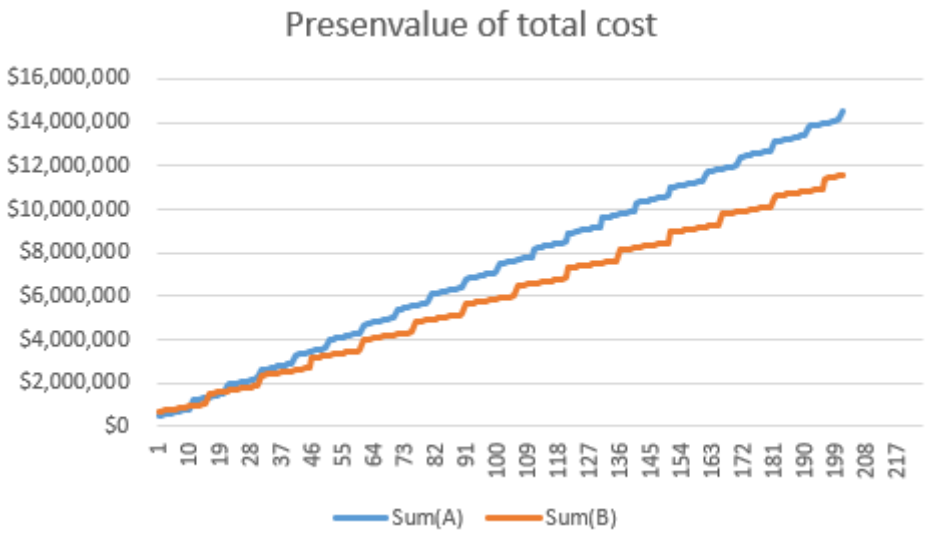
using the same method, we can get the similar annuity function of B:

$$A_{PV}(B) = 700000 + 25000(P/A, n, 12\%) + 12070.91(P/A, n, 12\%) \tag{4}$$

Assisted by Excel, we can get the graph of Annuity versus year of the two kind of surface:



The summarize of every-year cost versus year is plotted as follows:


Presenvalue of total cost
$16,000,000
$14,000,000
$12,000,000
$10,000,000
$8,000,000
$6,000,000
$4,000,000
$2,000,000
$0
1
10
19
28
37
46
55
64
73
82
91
100
109
118
127
136
145
154
163
172
181
190
199
208
217
Sum(A)
Sum(B)