Failure ??

Rope failure

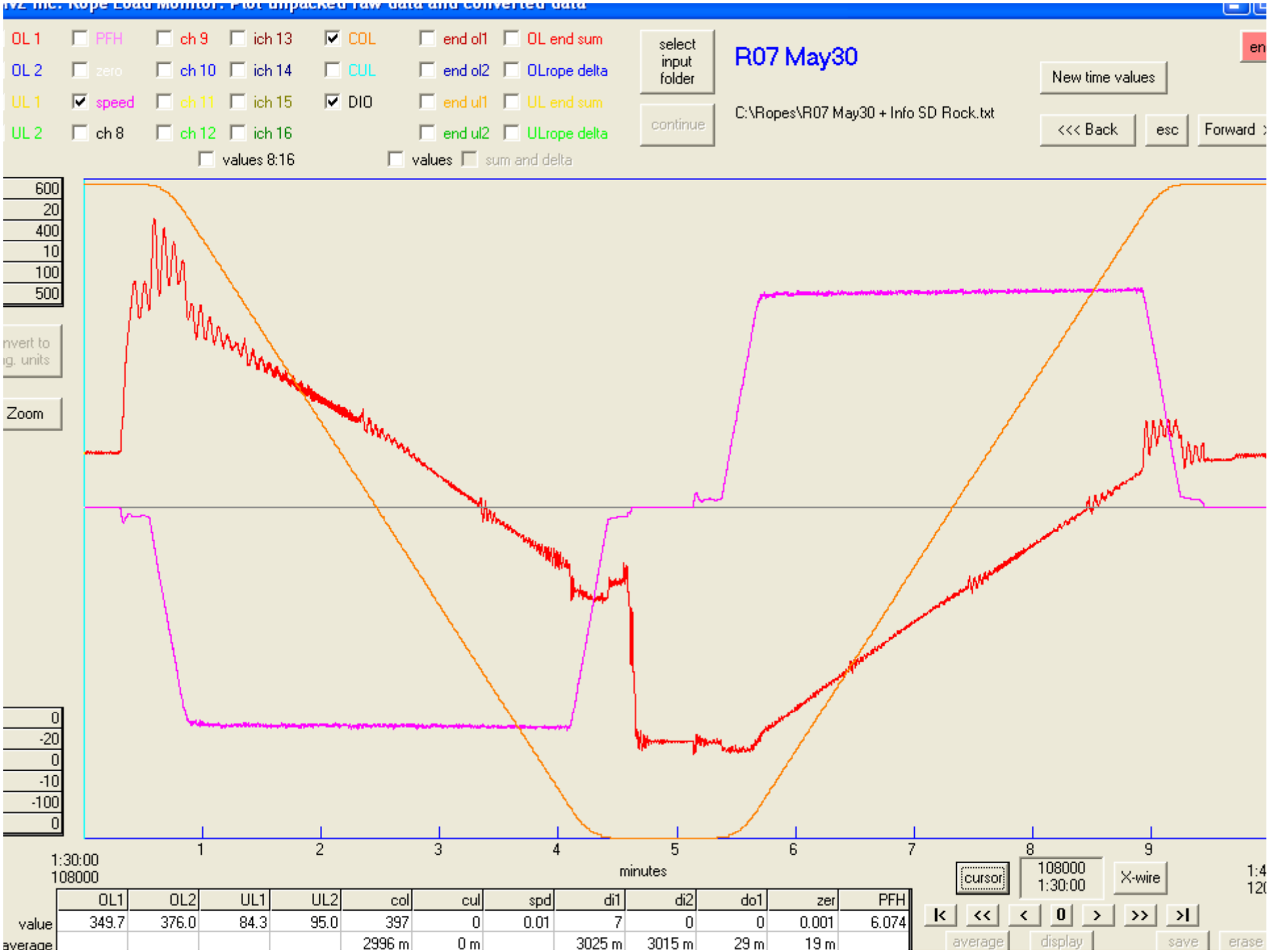
A rope will not fail as long as its strength is greater than any tensile load applied to it

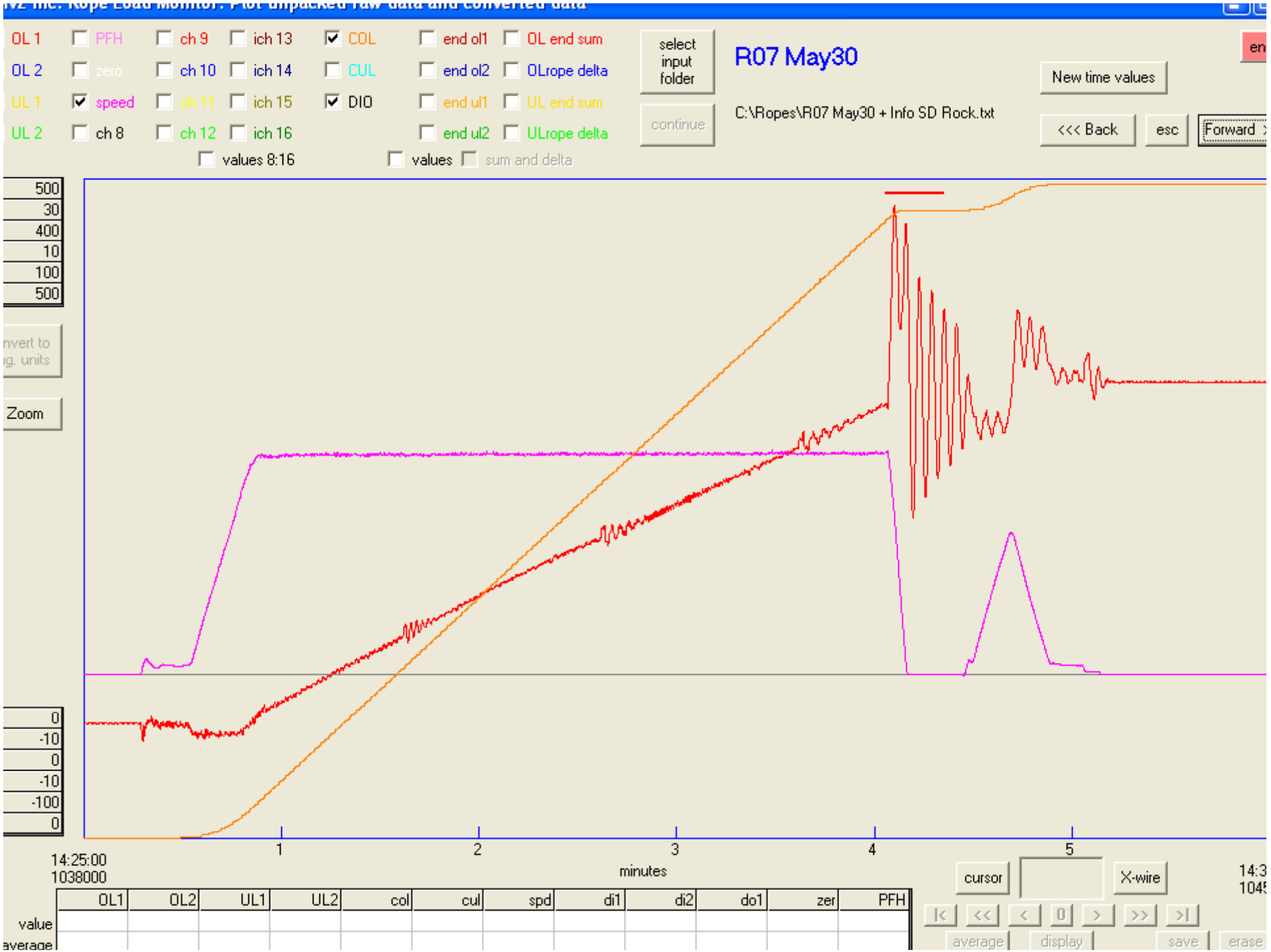
Rope loads

- are rope loads known?
- are they predictable?
- can rope loads be controlled?
- how do you control rope loads?

Rope loads

- normal rope loads for a rock winder
- rope loads during emergency braking
- and the rope loads when something goes wrong – brake control failure in this case


OL 1
PFH
ch 9
ich 13
COL
end ol1
OL end sum
OL 2
zero
ch 10
ich 14
CUL
end ol2
OLrope delta
UL 1
speed
ch 11
ich 15
DIO
end ul1
UL end sum
UL 2
ch 8
ch 12
ich 16
end ul2
ULrope delta
values 8:16
values
sum and delta
select input folder
continue
R07 May30
C:\Ropes\R07 May30 + Info SD Rock.txt
New time values
<<< Back
esc
Forward
600
20
400
10
100
500
Zoom
0
-20
0
-10
-100
0
1
2
3
4
5
6
7
8
9
minutes
1:30:00
108000
cursor
108000
1:30:00
X-wire
average
display
save
erase
OL1
OL2
UL1
UL2
col
cul
spd
di1
di2
do1
zer
PFH
value
349.7
376.0
84.3
95.0
397
0
0.01
7
0
0
0.001
6.074
2996 m
0 m
3025 m
3015 m
29 m
19 m


OL 1
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COL
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end ol2
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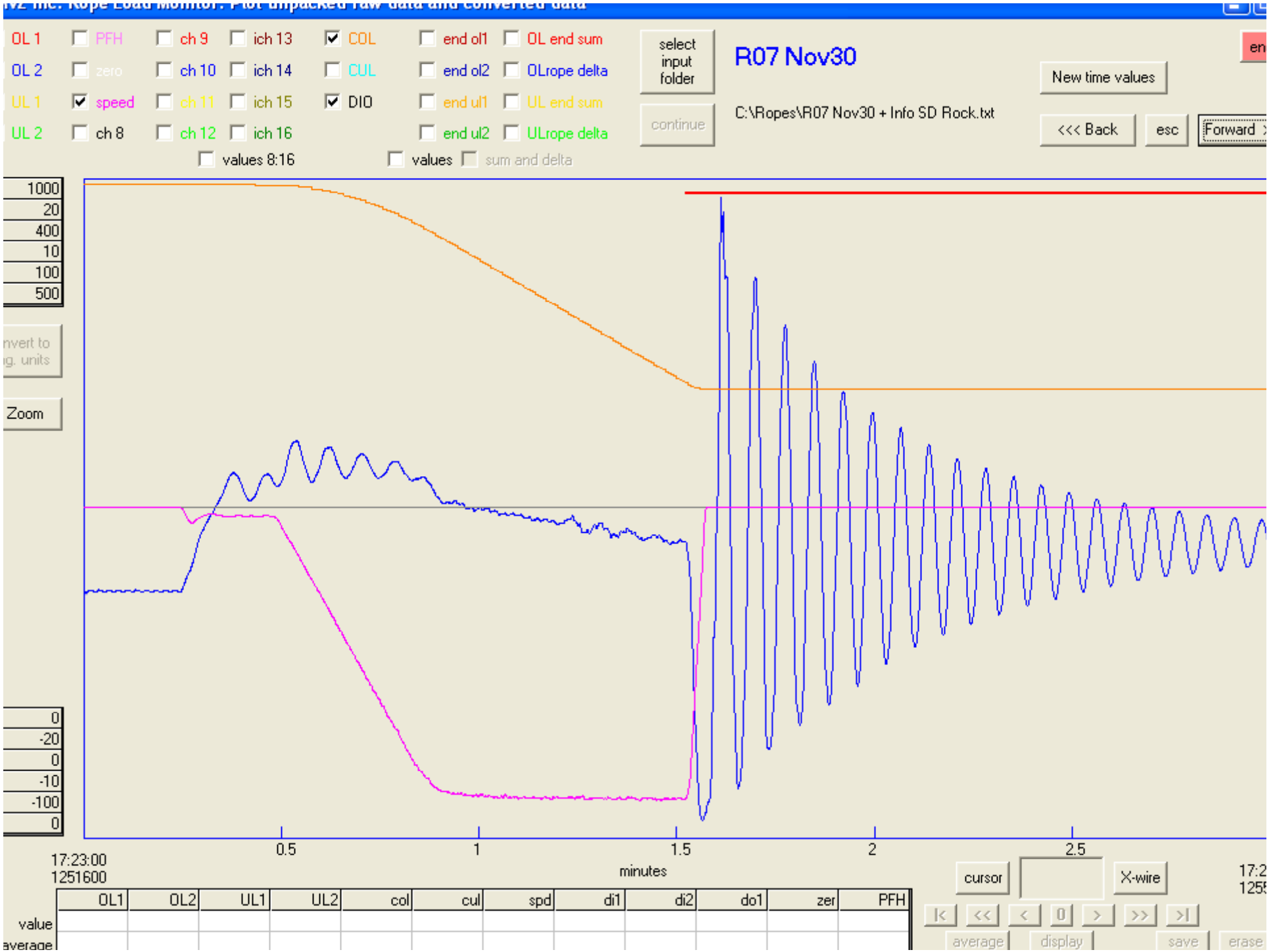
UL 1
speed
ch 11
ich 15
DIO
end ul1
UL end sum
UL 2
ch 8
ch 12
ich 16
end ul2
ULrope delta
values 8:16
values
sum and delta
select input folder
continue
R07 May30
C:\Ropes\R07 May30 + Info SD Rock.txt
New time values
<<< Back
esc
Forward
500
30
400
10
100
500
Zoom
0
-10
0
-10
-100
0
1
2
3
4
5
minutes
14:25:00
1038000
OL1
OL2
UL1
UL2
col
cul
spd
di1
di2
do1
zer
PFH
value
average
cursor
X-wire
average
display
save
erase


OL 1
PFH
ch 9
ich 13
COL
end ol1
OL end sum
OL 2
zero
ch 10
ich 14
CUL
end ol2
OLrope delta
UL 1
speed
ch 11
ich 15
DIO
end ul1
UL end sum
UL 2
ch 8
ch 12
ich 16
end ul2
ULrope delta
values 8:16
values
sum and delta
select input folder
continue
R07 Nov30
C:\Ropes\R07 Nov30 + Info SD Rock.txt
New time values
<<< Back
esc
Forward
1000
20
400
10
100
500
Zoom
0
-20
0
-10
-100
0
0.5
1
1.5
2
2.5
minutes
17:23:00
1251600
cursor
X-wire
average
display
save
erase
OL1
OL2
UL1
UL2
col
cul
spd
di1
di2
do1
zer
PFH
value

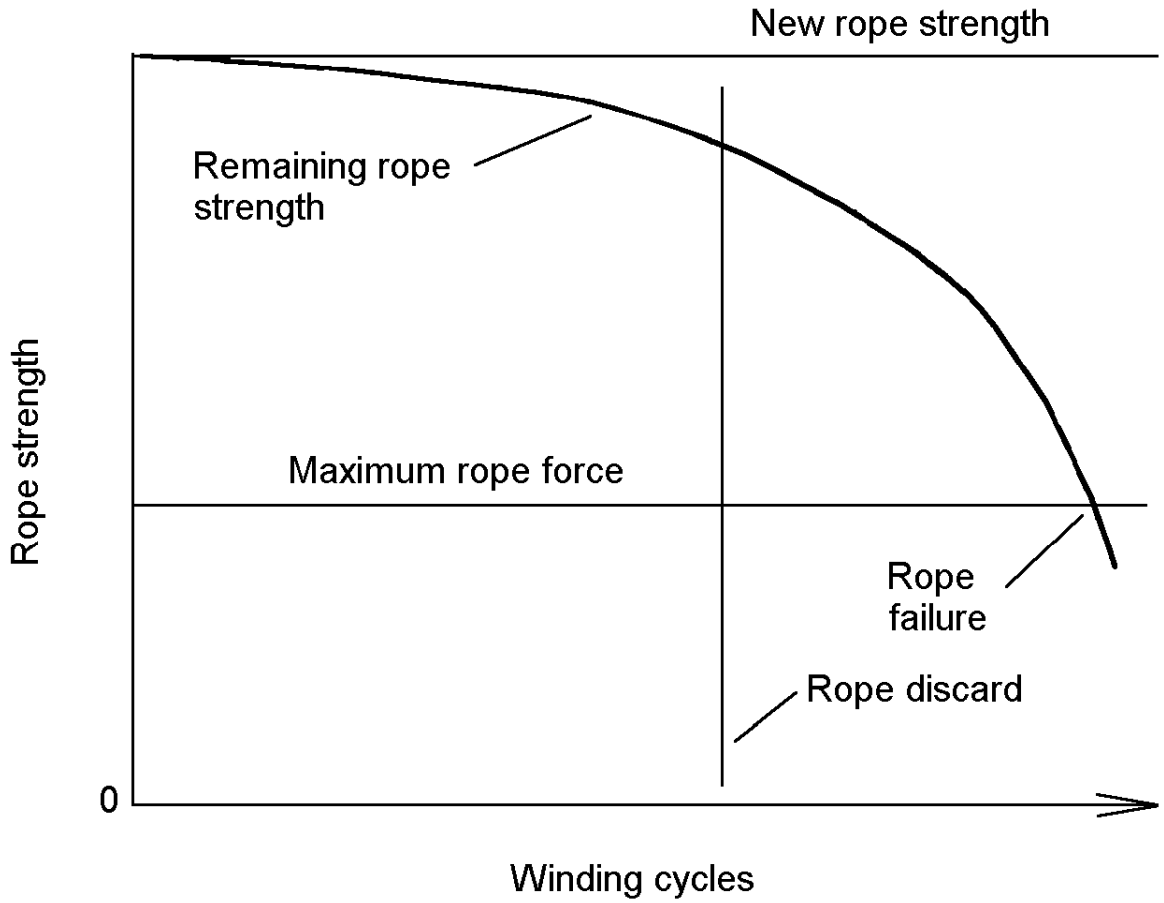
Controlling rope loads

- by specifying (static) safety factors
- at lower static safety factors, the dynamics become important, and you have to control dynamics directly (SABS 0294)

Rope deterioration

- the strength of a running rope reduces with usage or time
- therefore, if a running rope is left in service indefinitely, it will fail

rope strength reduces with usage



Rope deterioration mechanisms

- wear
- repeated loading (fatigue, broken wires, split wires)
- corrosion
- accidental damage

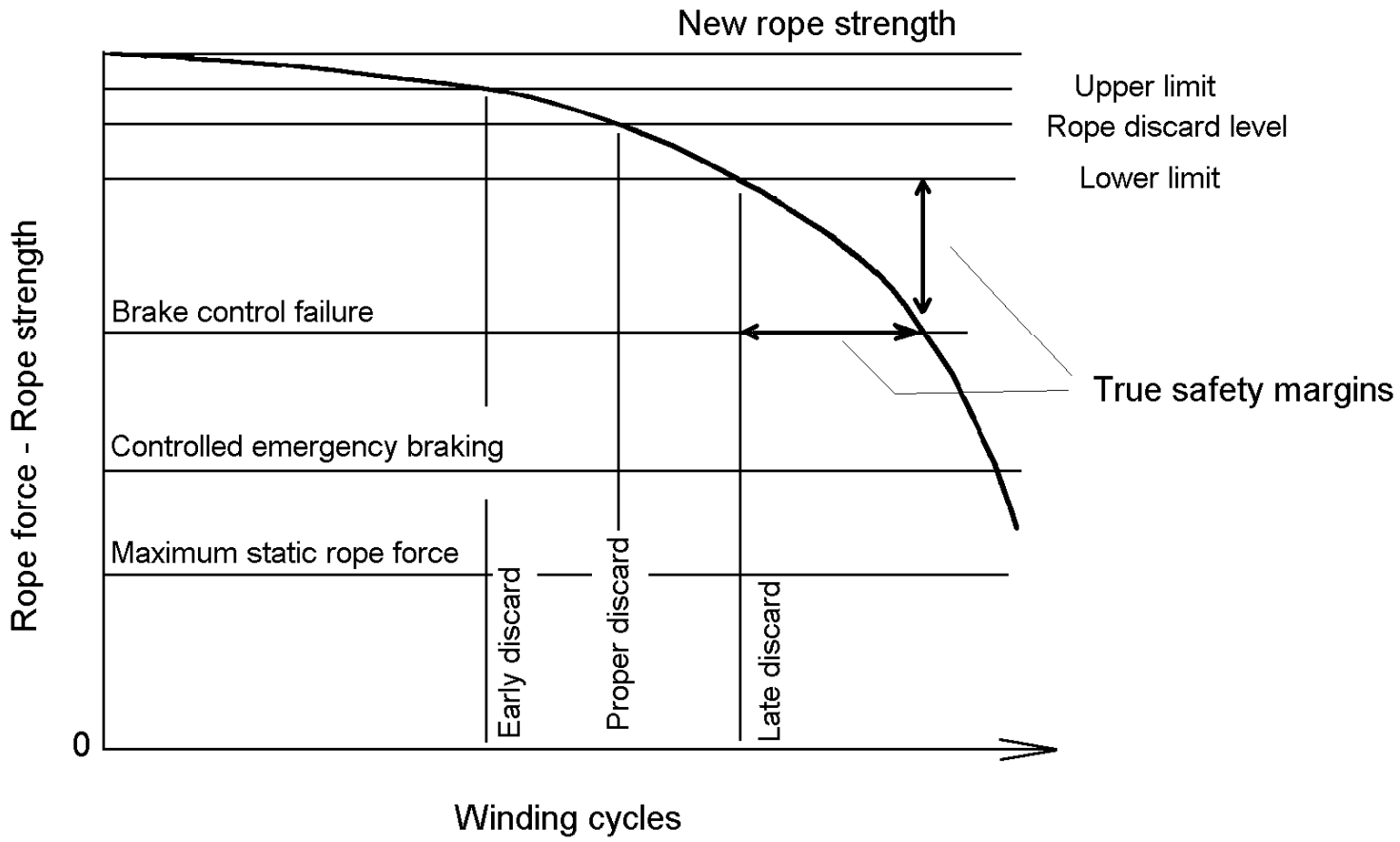
Controlling deterioration

- prevent accidental damage
- prevent corrosion
- prevent (abrasive) wear
- proper winder practice – proper coiling and drum layer cross-overs, pulling in back-ends, minimise contact stresses

Condition assessment

- the rope of licensed winders have to be assessed according to SABS 0293
- the discard criteria are based on an approximate 10% loss in strength
- rope condition assessment with the aid of magnetic rope testing equipment is a powerful tool – i.e. rope deterioration can be measured

a more accurate picture



to prevent rope failure

- control rope deterioration or the rate of deterioration
- control rope loads
- control the occurrence of incidents that can generate abnormal rope loads
- discard ropes timeously