NREL 5MW Aeroelastic Model

- Fatigue Loads Report -

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Author: Drew Gertz
Email: drew@northwindengineering.com
Checked by: Drew Gertz
Released by: Drew Gertz

Revision history

Revision	Date	Description	Contributor(s)
1	2024.09.22	Ultimate load cases according to IEC 61400-1	Drew Gertz

Post-processing details

Simulation type	fast
Mean wind speed [m/s]	8.5
Turbulence intensity @ 15 m/s [%]	16
Weibull shape factor	2
Cut-in wind speed [m/s]	3
Cut-out wind speed [m/s]	25
Number of lifetime cycles	1e7
Wohler exponents	3 4 5 6 7 8 9 10 11 12
Goodman correction	False
Lifetime [years]	20
Availability [%]	95

DLC details

Design load case	Number of simulations	Simulation length [s]	Initial period disregarded [s]	DLC type	Safety factors	Discrete occurences per year	Discrete wind speeds [m/s]
DLC12	216	620.0	20.0	production	1.0	0	0
DLC24	72	620.0	20.0	discrete_-weibull	1.0	144	0
DLC31	3	240.0	20.0	discrete	1.0	[1000, 50, 50]	[3, 13, 25]
DLC41	3	120.0	20.0	discrete	1.0	[1000, 50, 50]	[3, 13, 25]
DLC64	90	620.0	20.0	parked	1.0	0	0

Channel descriptions

Name	Units	Description
HSSBrTq	kN-m	High-speed shaft brake torque (i.e., the actual moment applied to the high-speed shaft by the brake)
LSSGagMya	kN-m	Rotating low-speed shaft bending moment at the shaft's strain gage (shaft strain gage located by input ShftGagL)
LSSGagMys	kN-m	Nonrotating low-speed shaft bending moment at the shaft's strain gage (shaft strain gage located by input ShftGagL)
LSSGagMza	kN-m	Rotating low-speed shaft bending moment at the shaft's strain gage (shaft strain gage located by input ShftGagL)
LSSGagMzs	kN-m	Nonrotating low-speed shaft bending moment at the shaft's strain gage (shaft strain gage located by input ShftGagL)
LSSTipMya	kN-m	Rotating low-speed shaft bending moment at the shaft tip (teeter pin for 2-blader, apex of rotation for 3-blader)
LSSTipMza	kN-m	Rotating low-speed shaft bending moment at the shaft tip (teeter pin for 2-blader, apex of rotation for 3-blader)
LSShftFxa	kN	Low-speed shaft thrust force (this is constant along the shaft and is equivalent to the rotor thrust force)
LSShftFya	kN	Rotating low-speed shaft shear force (this is constant along the shaft)
LSShftFys	kN	Nonrotating low-speed shaft shear force (this is constant along the shaft)
LSShftFza	kN	Rotating low-speed shaft shear force (this is constant along the shaft)
LSShftFzs	kN	Nonrotating low-speed shaft shear force (this is constant along the shaft)
LSShftMxa	kN-m	Low-speed shaft torque (this is constant along the shaft and is equivalent to the rotor torque)
RootFxb1	kN	Blade 1 flapwise shear force at the blade root
RootFxb2	kN	Blade 2 flapwise shear force at the blade root
RootFxb3	kN	Blade 3 flapwise shear force at the blade root
RootFxc1	kN	Blade 1 out-of-plane shear force at the blade root
RootFxc2	kN	Blade 2 out-of-plane shear force at the blade root
RootFxc3	kN	Blade 3 out-of-plane shear force at the blade root
RootFyb1	kN	Blade 1 edgewise shear force at the blade root
RootFyb2	kN	Blade 2 edgewise shear force at the blade root
RootFyb3	kN	Blade 3 edgewise shear force at the blade root
RootFyc1	kN	Blade 1 in-plane shear force at the blade root
RootFyc2	kN	Blade 2 in-plane shear force at the blade root
RootFyc3	kN	Blade 3 in-plane shear force at the blade root
RootFzc1	kN	Blade 1 axial force at the blade root
RootFzc2	kN	Blade 2 axial force at the blade root
RootFzc3	kN	Blade 3 axial force at the blade root
RootMxb1	kN-m	Blade 1 edgewise moment (i.e., the moment caused by edgewise forces) at the blade root
RootMxb2	kN-m	Blade 2 edgewise moment (i.e., the moment caused by edgewise forces) at the blade root
RootMxb3	kN-m	Blade 3 edgewise moment (i.e., the moment caused by edgewise forces) at the blade root
RootMxc1	kN-m	Blade 1 in-plane moment (i.e., the moment caused by in-plane forces) at the blade root
RootMxc2	kN-m	Blade 2 in-plane moment (i.e., the moment caused by in-plane forces) at the blade root
RootMxc3	kN-m	Blade 3 in-plane moment (i.e., the moment caused by in-plane forces) at the blade root
RootMyb1	kN-m	Blade 1 flapwise moment (i.e., the moment caused by flapwise forces) at the blade root

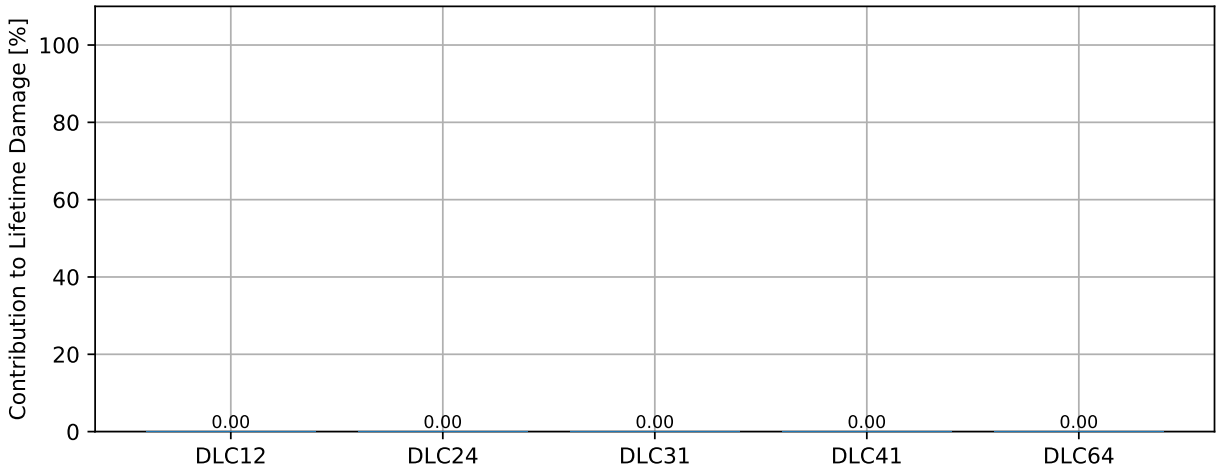
Name	Units	Description
RootMyb2	kN-m	Blade 2 flapwise moment (i.e., the moment caused by flapwise forces) at the blade root
RootMyb3	kN-m	Blade 3 flapwise moment (i.e., the moment caused by flapwise forces) at the blade root
RootMyc1	kN-m	Blade 1 out-of-plane moment (i.e., the moment caused by out-of-plane forces) at the blade root
RootMyc2	kN-m	Blade 2 out-of-plane moment (i.e., the moment caused by out-of-plane forces) at the blade root
RootMyc3	kN-m	Blade 3 out-of-plane moment (i.e., the moment caused by out-of-plane forces) at the blade root
RootMzc1	kN-m	Blade 1 pitching moment at the blade root
RootMzc2	kN-m	Blade 2 pitching moment at the blade root
RootMzc3	kN-m	Blade 3 pitching moment at the blade root
TwrBsFxt	kN	Tower base fore-aft shear force
TwrBsFyt	kN	Tower base side-to-side shear force
TwrBsFzt	kN	Tower base axial force
TwrBsMxt	kN-m	Tower base roll (or side-to-side) moment (i.e., the moment caused by side-to-side forces)
TwrBsMyt	kN-m	Tower base pitching (or fore-aft) moment (i.e., the moment caused by fore-aft forces)
TwrBsMzt	kN-m	Tower base yaw (or torsional) moment
YawBrFxp	kN	Tower-top / yaw bearing fore-aft (nonrotating) shear force
YawBrFyp	kN	Tower-top / yaw bearing side-to-side (nonrotating) shear force
YawBrFzn	kN	Tower-top / yaw bearing axial force
YawBrMxp	kN-m	Nonrotating tower-top / yaw bearing roll moment
YawBrMyp	kN-m	Nonrotating tower-top / yaw bearing pitch moment
YawBrMzn	kN-m	Tower-top / yaw bearing yaw moment

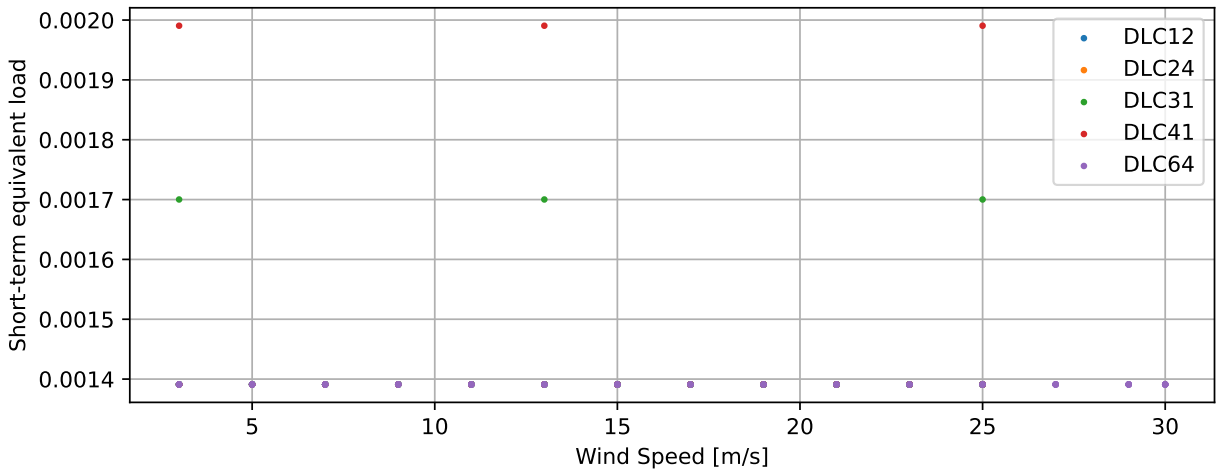
Loads table

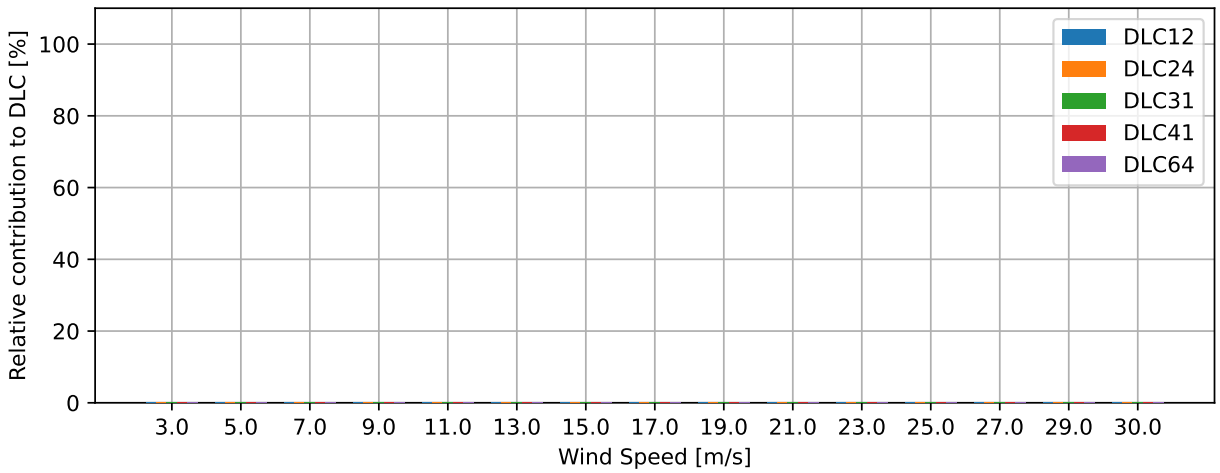
Channel	Units	Exp_3	Exp_4	Exp_5	Exp_6	Exp_7	Exp_8	Exp_9	Exp_10	Exp_11	Exp_12
HSSBrTq	kN-m	1.03e-01	1.24e-01	1.39e-01	1.50e-01	1.59e-01	1.65e-01	1.71e-01	1.75e-01	1.79e-01	1.82e-01
LSSGagMya	kN-m	1.26e+04	1.10e+04	1.03e+04	1.01e+04	1.00e+04	1.01e+04	1.03e+04	1.05e+04	1.07e+04	1.10e+04
LSSGagMys	kN-m	8.97e+03	7.87e+03	7.69e+03	7.85e+03	8.14e+03	8.48e+03	8.83e+03	9.18e+03	9.52e+03	9.85e+03
LSSGagMza	kN-m	1.27e+04	1.10e+04	1.04e+04	1.01e+04	1.01e+04	1.02e+04	1.04e+04	1.06e+04	1.08e+04	1.11e+04
LSSGagMzs	kN-m	8.77e+03	7.66e+03	7.47e+03	7.61e+03	7.90e+03	8.23e+03	8.58e+03	8.92e+03	9.26e+03	9.58e+03
LSSTipMya	kN-m	1.23e+04	1.12e+04	1.08e+04	1.08e+04	1.09e+04	1.12e+04	1.14e+04	1.17e+04	1.21e+04	1.24e+04
LSSTipMza	kN-m	1.24e+04	1.12e+04	1.09e+04	1.09e+04	1.10e+04	1.13e+04	1.15e+04	1.19e+04	1.22e+04	1.26e+04
LSShftFxa	kN	4.47e+02	4.33e+02	4.42e+02	4.59e+02	4.81e+02	5.06e+02	5.36e+02	5.69e+02	6.03e+02	6.38e+02
LSShftFya	kN	4.38e+03	3.67e+03	3.30e+03	3.07e+03	2.92e+03	2.81e+03	2.73e+03	2.67e+03	2.62e+03	2.58e+03
LSShftFys	kN	1.24e+02	1.13e+02	1.14e+02	1.20e+02	1.27e+02	1.35e+02	1.43e+02	1.51e+02	1.59e+02	1.66e+02
LSShftFza	kN	4.37e+03	3.66e+03	3.30e+03	3.07e+03	2.92e+03	2.81e+03	2.73e+03	2.67e+03	2.62e+03	2.57e+03
LSShftFzs	kN	1.82e+02	1.52e+02	1.44e+02	1.45e+02	1.49e+02	1.55e+02	1.62e+02	1.70e+02	1.77e+02	1.85e+02
LSShftMxa	kN-m	1.69e+03	1.60e+03	1.70e+03	1.86e+03	2.05e+03	2.25e+03	2.45e+03	2.65e+03	2.83e+03	2.99e+03
RootFxb1	kN	3.05e+02	2.81e+02	2.75e+02	2.76e+02	2.81e+02	2.87e+02	2.94e+02	3.02e+02	3.11e+02	3.19e+02
RootFxb2	kN	3.05e+02	2.81e+02	2.76e+02	2.78e+02	2.83e+02	2.89e+02	2.97e+02	3.06e+02	3.15e+02	3.24e+02
RootFxb3	kN	3.05e+02	2.81e+02	2.76e+02	2.78e+02	2.83e+02	2.89e+02	2.97e+02	3.05e+02	3.13e+02	3.22e+02
RootFxc1	kN	2.76e+02	2.51e+02	2.44e+02	2.44e+02	2.48e+02	2.53e+02	2.59e+02	2.66e+02	2.74e+02	2.83e+02
RootFxc2	kN	2.76e+02	2.51e+02	2.45e+02	2.46e+02	2.50e+02	2.56e+02	2.64e+02	2.74e+02	2.85e+02	2.97e+02
RootFxc3	kN	2.76e+02	2.51e+02	2.44e+02	2.44e+02	2.48e+02	2.53e+02	2.58e+02	2.65e+02	2.72e+02	2.79e+02
RootFyb1	kN	7.17e+02	6.01e+02	5.41e+02	5.05e+02	4.80e+02	4.63e+02	4.50e+02	4.40e+02	4.32e+02	4.25e+02
RootFyb2	kN	7.17e+02	6.01e+02	5.41e+02	5.05e+02	4.80e+02	4.63e+02	4.50e+02	4.39e+02	4.31e+02	4.25e+02
RootFyb3	kN	7.17e+02	6.02e+02	5.41e+02	5.05e+02	4.80e+02	4.63e+02	4.50e+02	4.40e+02	4.32e+02	4.25e+02
RootFyc1	kN	7.25e+02	6.09e+02	5.48e+02	5.12e+02	4.87e+02	4.70e+02	4.57e+02	4.47e+02	4.40e+02	4.34e+02
RootFyc2	kN	7.25e+02	6.09e+02	5.48e+02	5.12e+02	4.87e+02	4.70e+02	4.57e+02	4.47e+02	4.40e+02	4.34e+02
RootFyc3	kN	7.25e+02	6.09e+02	5.48e+02	5.12e+02	4.87e+02	4.70e+02	4.57e+02	4.48e+02	4.40e+02	4.34e+02
RootFzc1	kN	7.13e+02	6.09e+02	5.62e+02	5.41e+02	5.36e+02	5.40e+02	5.50e+02	5.62e+02	5.75e+02	5.88e+02
RootFzc2	kN	7.13e+02	6.08e+02	5.61e+02	5.40e+02	5.34e+02	5.38e+02	5.47e+02	5.59e+02	5.72e+02	5.84e+02
RootFzc3	kN	7.13e+02	6.08e+02	5.61e+02	5.40e+02	5.35e+02	5.39e+02	5.48e+02	5.60e+02	5.72e+02	5.85e+02
RootMxb1	kN-m	1.51e+04	1.27e+04	1.14e+04	1.07e+04	1.02e+04	9.82e+03	9.56e+03	9.36e+03	9.21e+03	9.10e+03
RootMxb2	kN-m	1.51e+04	1.27e+04	1.14e+04	1.07e+04	1.02e+04	9.81e+03	9.54e+03	9.34e+03	9.18e+03	9.06e+03
RootMxb3	kN-m	1.51e+04	1.27e+04	1.14e+04	1.07e+04	1.02e+04	9.80e+03	9.54e+03	9.34e+03	9.18e+03	9.06e+03
RootMxc1	kN-m	1.54e+04	1.29e+04	1.17e+04	1.09e+04	1.04e+04	1.01e+04	9.86e+03	9.69e+03	9.56e+03	9.48e+03
RootMxc2	kN-m	1.54e+04	1.29e+04	1.17e+04	1.09e+04	1.04e+04	1.01e+04	9.86e+03	9.69e+03	9.56e+03	9.48e+03
RootMxc3	kN-m	1.54e+04	1.29e+04	1.17e+04	1.09e+04	1.04e+04	1.01e+04	9.86e+03	9.69e+03	9.57e+03	9.48e+03
RootMyb1	kN-m	1.04e+04	9.56e+03	9.38e+03	9.43e+03	9.59e+03	9.81e+03	1.01e+04	1.03e+04	1.06e+04	1.09e+04
RootMyb2	kN-m	1.03e+04	9.56e+03	9.41e+03	9.50e+03	9.69e+03	9.94e+03	1.02e+04	1.05e+04	1.08e+04	1.12e+04
RootMyb3	kN-m	1.03e+04	9.57e+03	9.41e+03	9.48e+03	9.65e+03	9.88e+03	1.01e+04	1.04e+04	1.07e+04	1.10e+04
RootMyc1	kN-m	9.81e+03	9.01e+03	8.82e+03	8.86e+03	9.01e+03	9.22e+03	9.48e+03	9.77e+03	1.01e+04	1.04e+04
RootMyc2	kN-m	9.78e+03	9.01e+03	8.85e+03	8.92e+03	9.11e+03	9.37e+03	9.68e+03	1.00e+04	1.04e+04	1.08e+04
RootMyc3	kN-m	9.79e+03	9.01e+03	8.84e+03	8.90e+03	9.06e+03	9.27e+03	9.52e+03	9.79e+03	1.01e+04	1.04e+04
RootMzc1	kN-m	1.99e+02	1.74e+02	1.63e+02	1.56e+02	1.53e+02	1.51e+02	1.50e+02	1.50e+02	1.50e+02	1.51e+02
RootMzc2	kN-m	1.99e+02	1.75e+02	1.63e+02	1.57e+02	1.54e+02	1.53e+02	1.53e+02	1.55e+02	1.58e+02	1.63e+02
RootMzc3	kN-m	1.99e+02	1.74e+02	1.63e+02	1.57e+02	1.53e+02	1.51e+02	1.51e+02	1.50e+02	1.51e+02	1.51e+02
TwrBsFxt	kN	8.86e+02	8.07e+02	8.11e+02	8.46e+02	8.99e+02	9.64e+02	1.04e+03	1.11e+03	1.19e+03	1.26e+03
TwrBsFyt	kN	3.42e+02	3.04e+02	3.00e+02	3.10e+02	3.27e+02	3.47e+02	3.68e+02	3.89e+02	4.09e+02	4.28e+02
TwrBsFzt	kN	1.41e+02	1.28e+02	1.27e+02	1.32e+02	1.38e+02	1.46e+02	1.54e+02	1.62e+02	1.70e+02	1.78e+02
TwrBsMxt	kN-m	2.40e+04	2.20e+04	2.21e+04	2.33e+04	2.52e+04	2.73e+04	2.95e+04	3.15e+04	3.33e+04	3.50e+04
TwrBsMyt	kN-m	6.55e+04	6.40e+04	6.77e+04	7.47e+04	8.40e+04	9.46e+04	1.05e+05	1.15e+05	1.25e+05	1.33e+05
TwrBsMzt	kN-m	8.76e+03	7.66e+03	7.46e+03	7.61e+03	7.90e+03	8.24e+03	8.59e+03	8.94e+03	9.28e+03	9.60e+03
YawBrFxp	kN	6.79e+02	6.54e+02	6.77e+02	7.19e+02	7.74e+02	8.37e+02	9.07e+02	9.78e+02	1.05e+03	1.12e+03
YawBrFyp	kN	2.42e+02	2.20e+02	2.20e+02	2.32e+02	2.49e+02	2.68e+02	2.88e+02	3.07e+02	3.24e+02	3.40e+02

Channel	Units	Exp_3	Exp_4	Exp_5	Exp_6	Exp_7	Exp_8	Exp_9	Exp_10	Exp_11	Exp_12
YawBrFzn	kN	1.40e+02	1.27e+02	1.27e+02	1.31e+02	1.38e+02	1.45e+02	1.54e+02	1.62e+02	1.70e+02	1.78e+02
YawBrMxp	kN-m	1.93e+03	1.80e+03	1.86e+03	1.98e+03	2.12e+03	2.27e+03	2.42e+03	2.57e+03	2.72e+03	2.86e+03
YawBrMyp	kN-m	8.96e+03	7.87e+03	7.70e+03	7.87e+03	8.17e+03	8.51e+03	8.86e+03	9.21e+03	9.54e+03	9.86e+03
YawBrMzn	kN-m	8.76e+03	7.65e+03	7.46e+03	7.61e+03	7.90e+03	8.24e+03	8.59e+03	8.94e+03	9.27e+03	9.60e+03

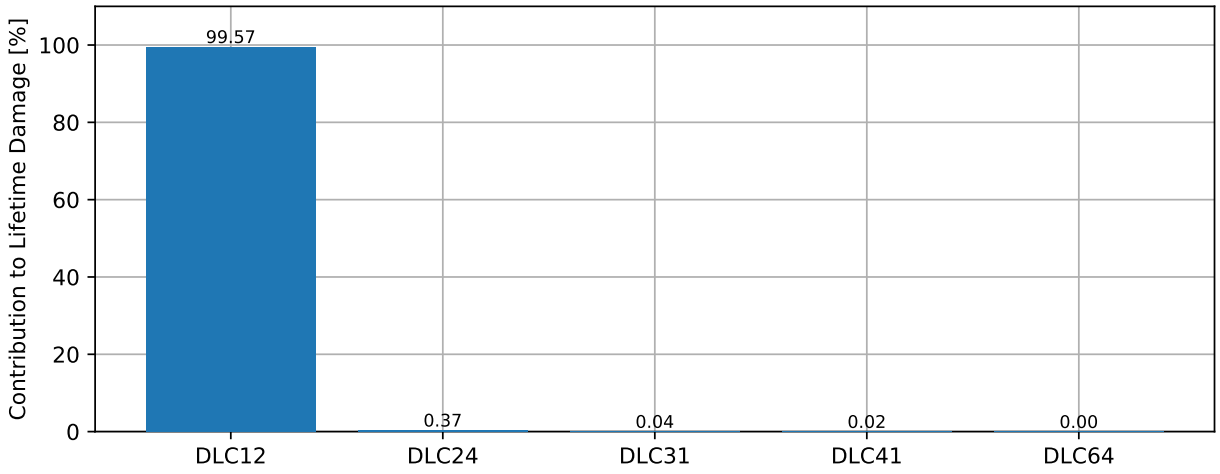
HSSBrTq_[kN-m]

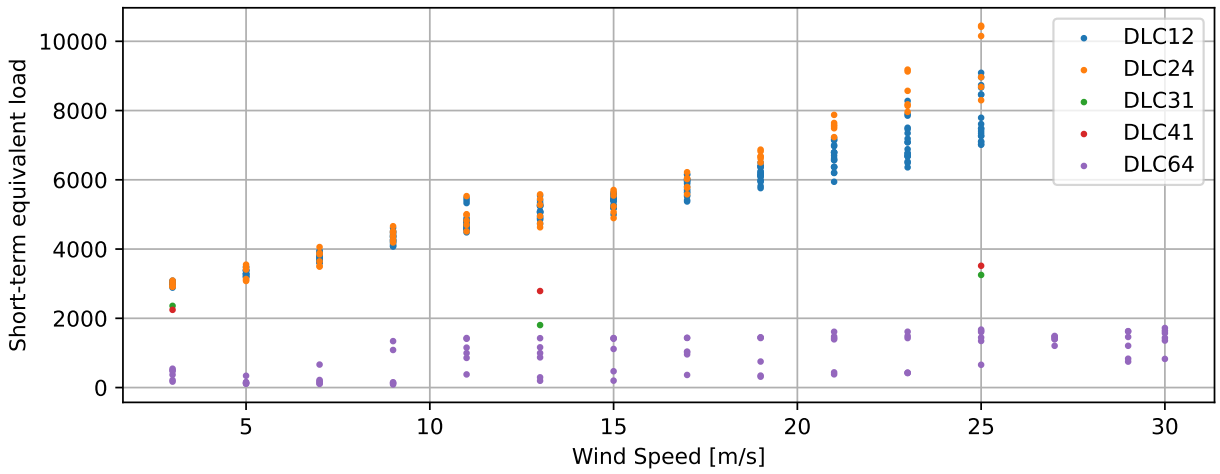

Contribution to Lifetime Damage [%]
100
80
60
40
20
0
0.00
0.00
0.00
0.00
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

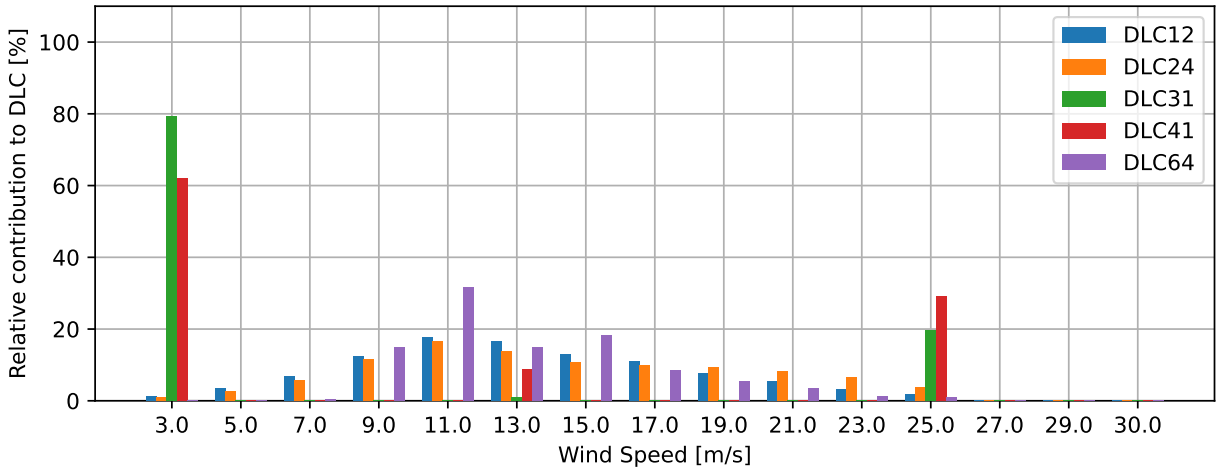

Short-term equivalent load
0.0020
0.0019
0.0018
0.0017
0.0016
0.0015
0.0014
5
10
15
20
25
30
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
100
80
60
40
20
0
3.0
5.0
7.0
9.0
11.0
13.0
15.0
17.0
19.0
21.0
23.0
25.0
27.0
29.0
30.0
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

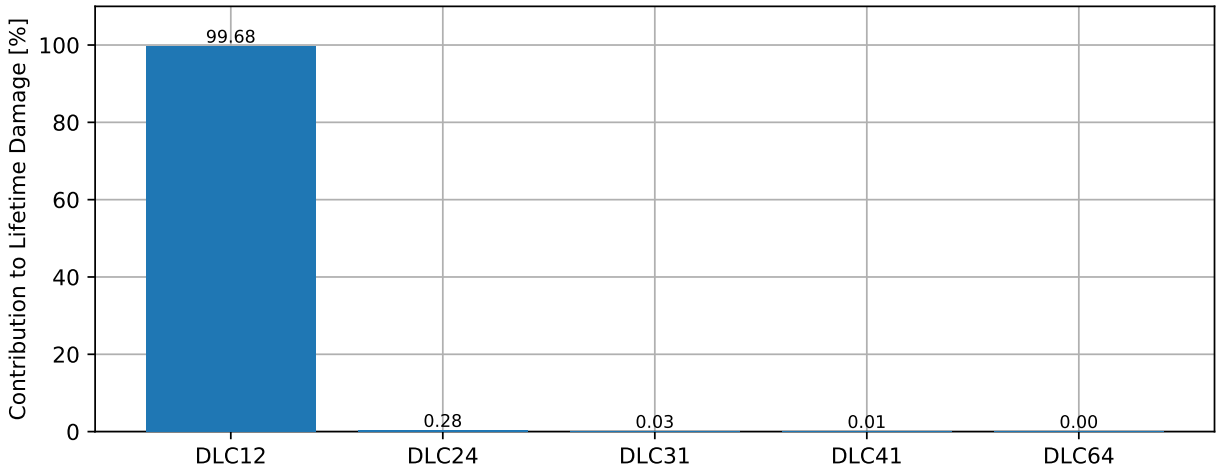
LSSGagMya_ [kN-m]

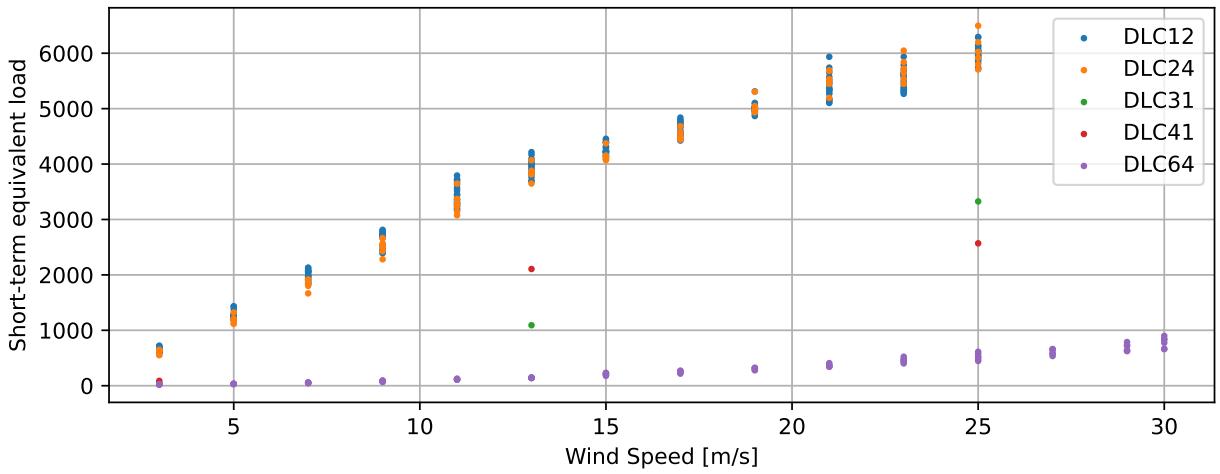


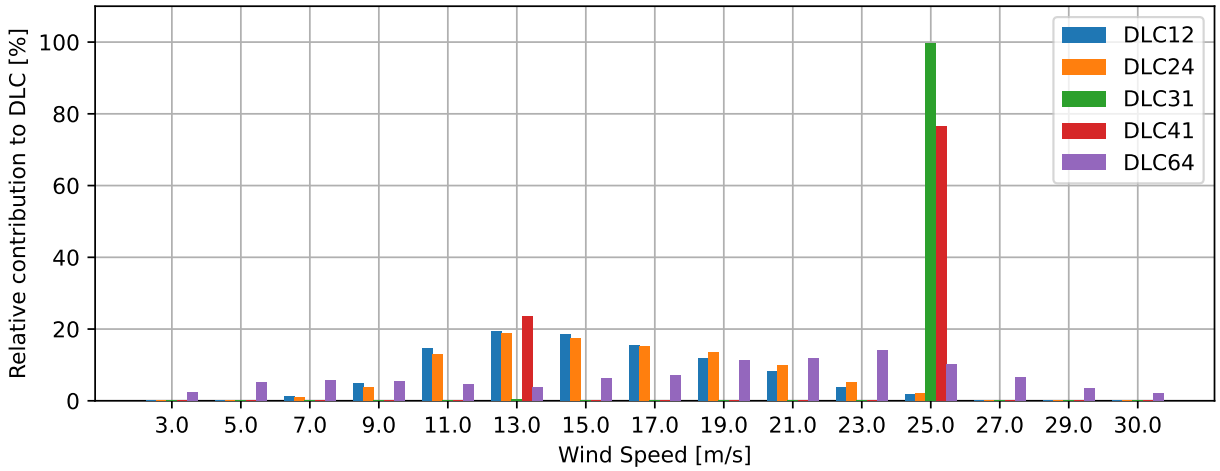




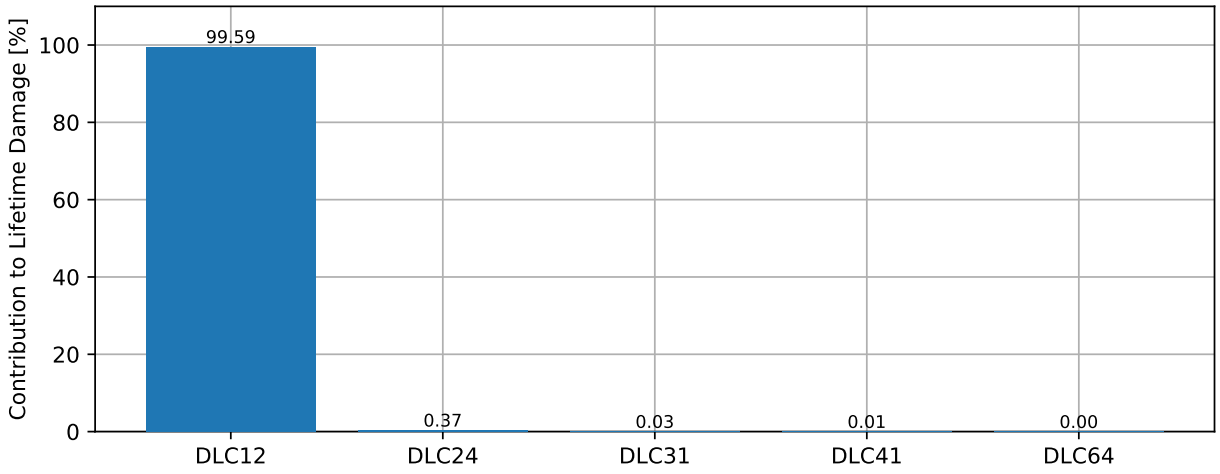
LSSGagMys_[kN-m]

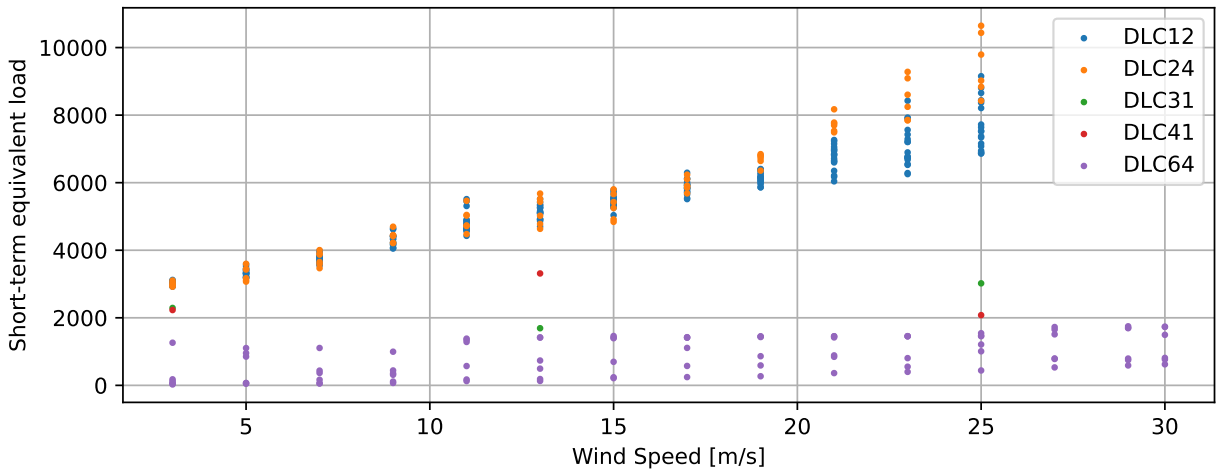


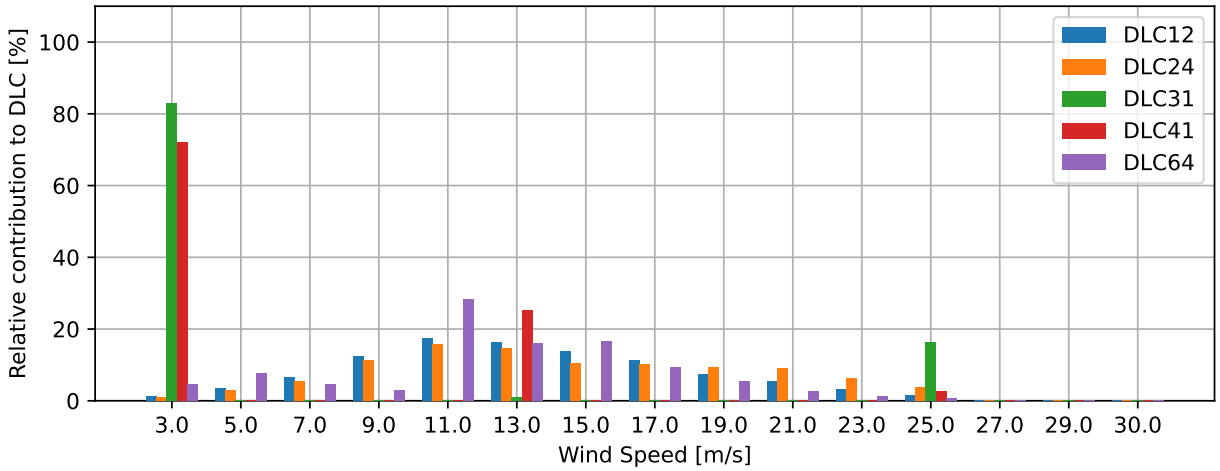




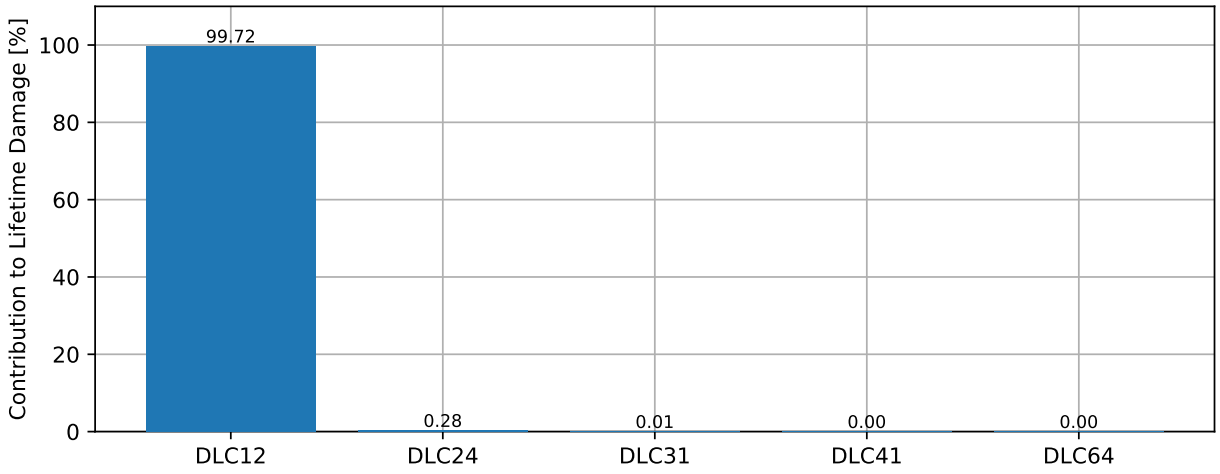
LSSGagMza_ [kN-m]

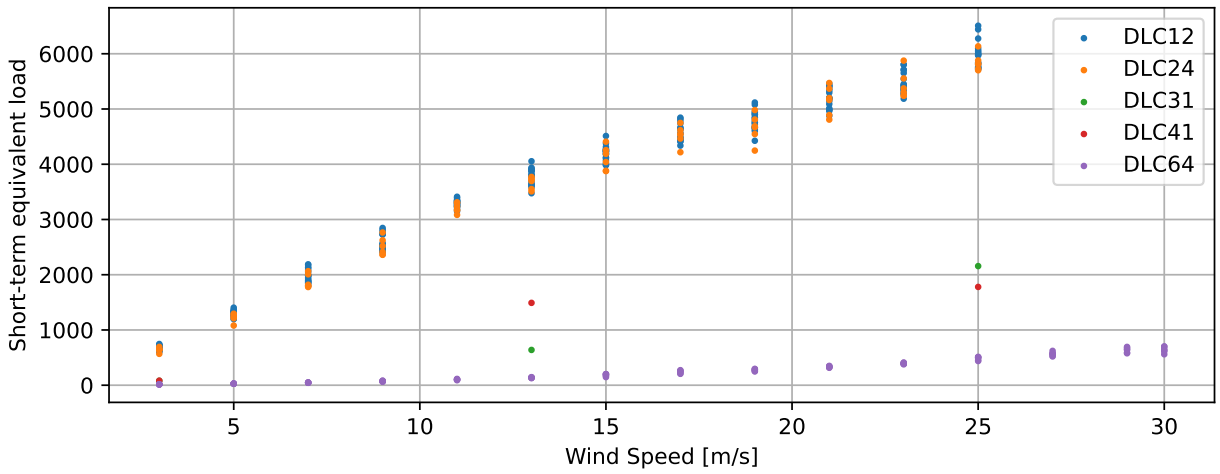


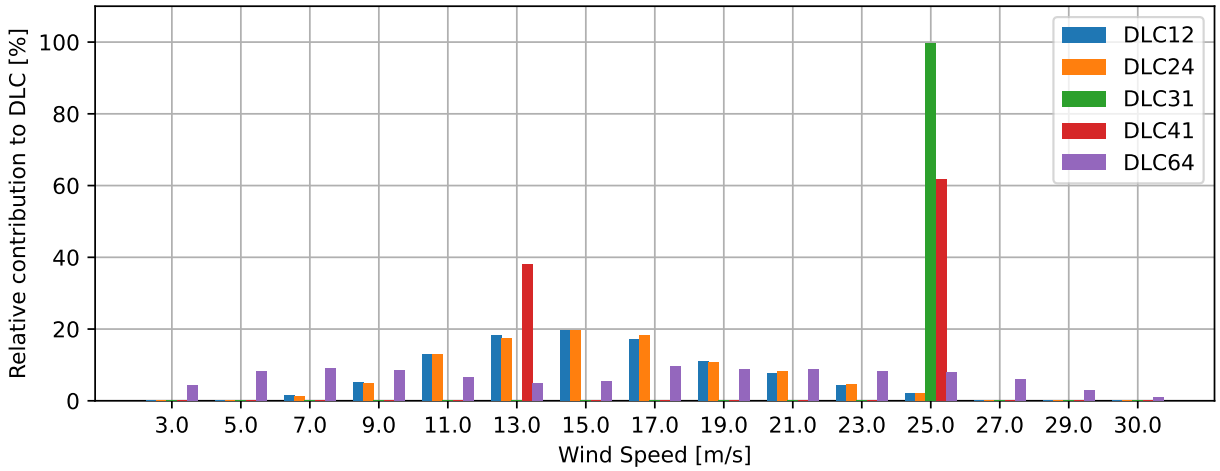




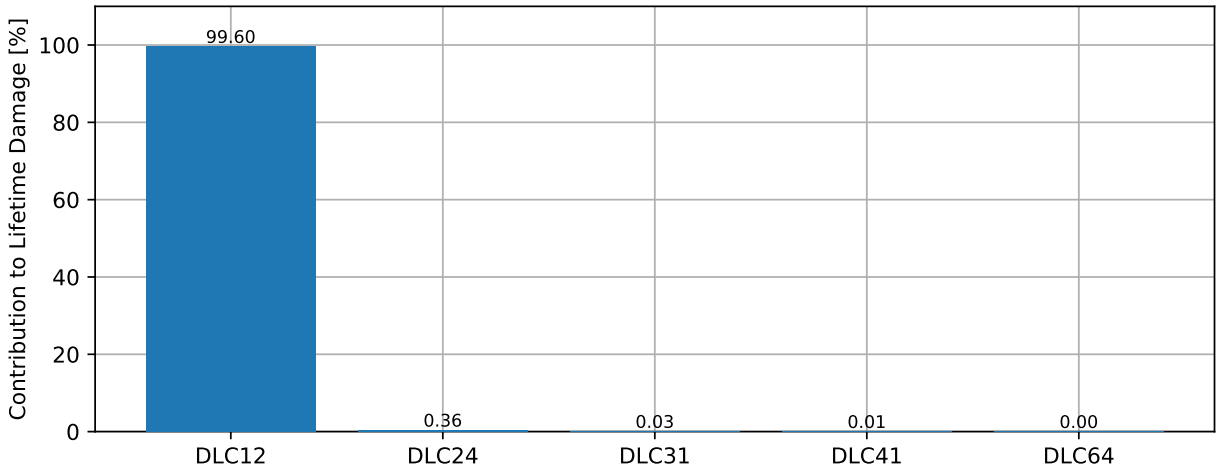
LSSGagMzs_[kN-m]

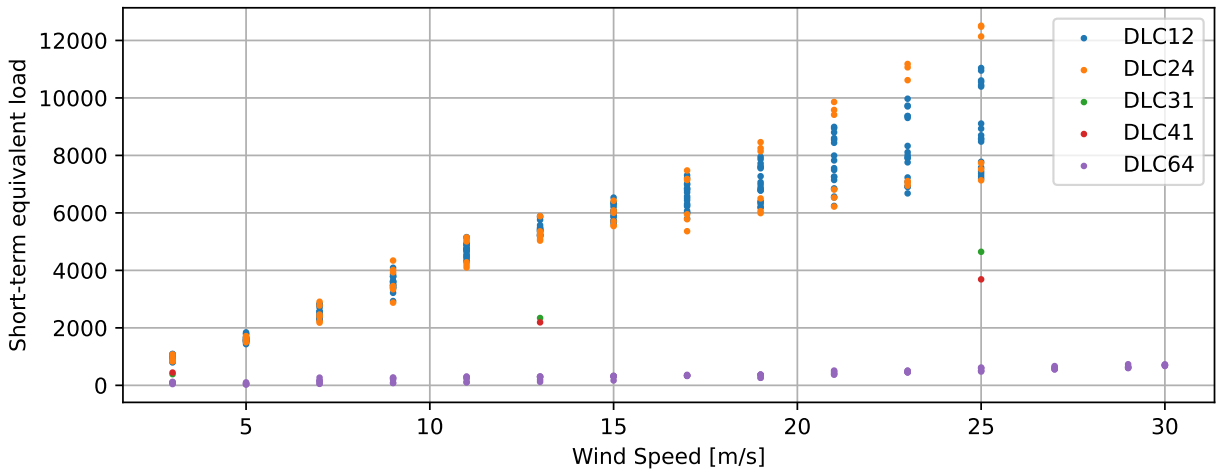


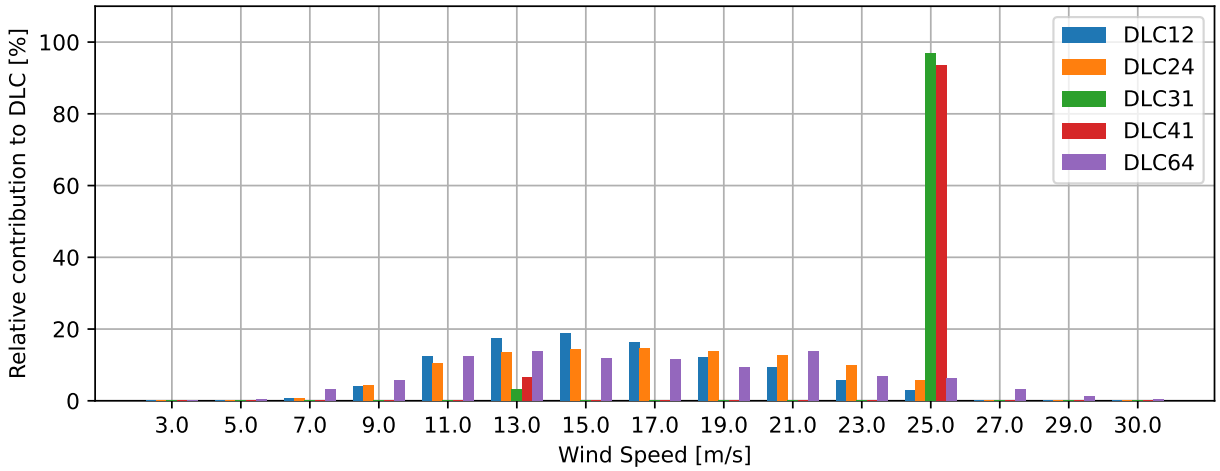




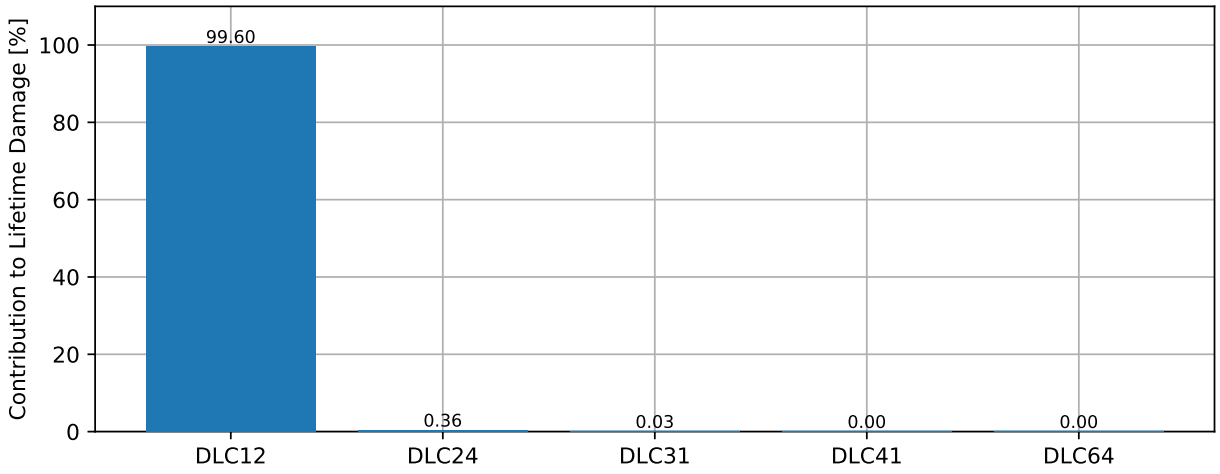
LSSTipMya_[kN-m]

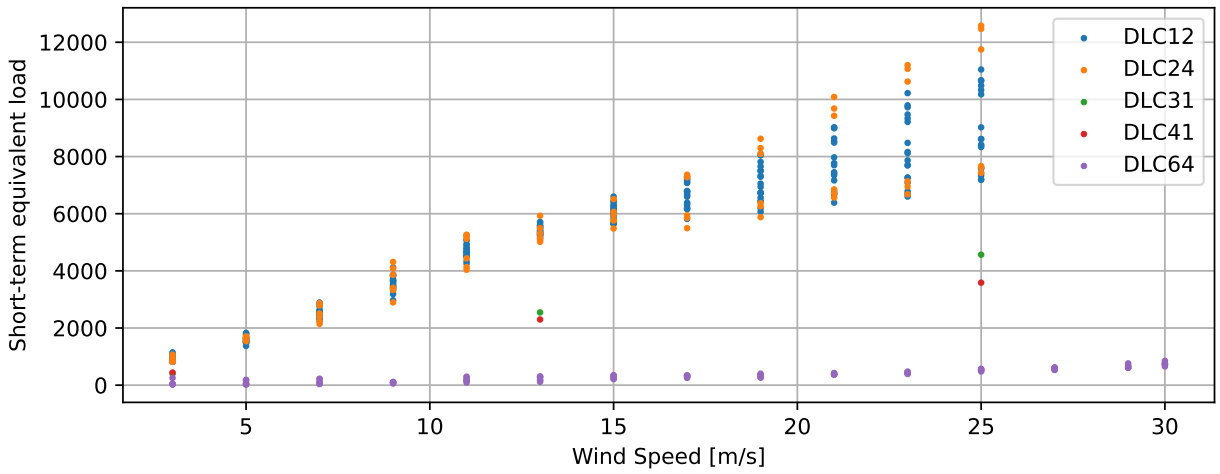


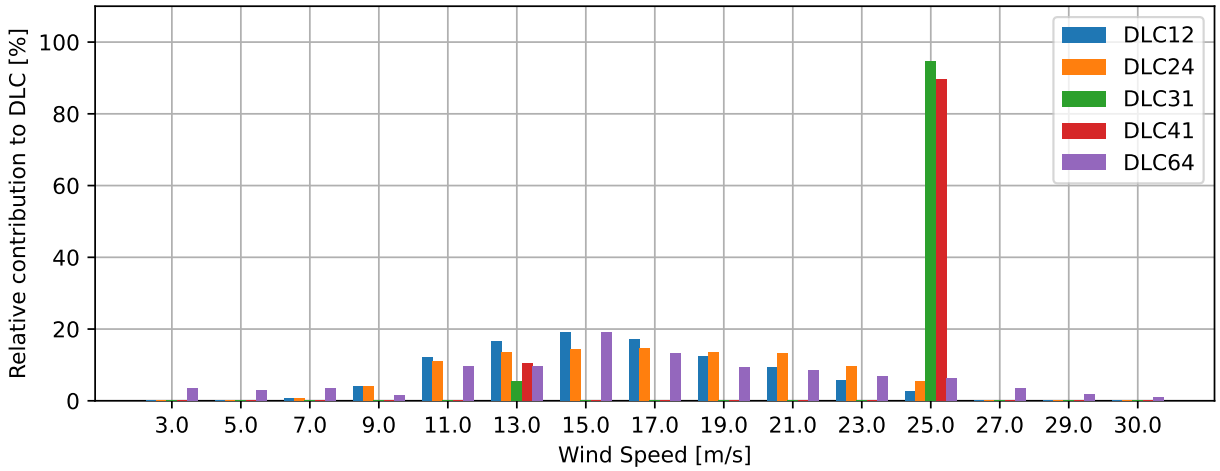




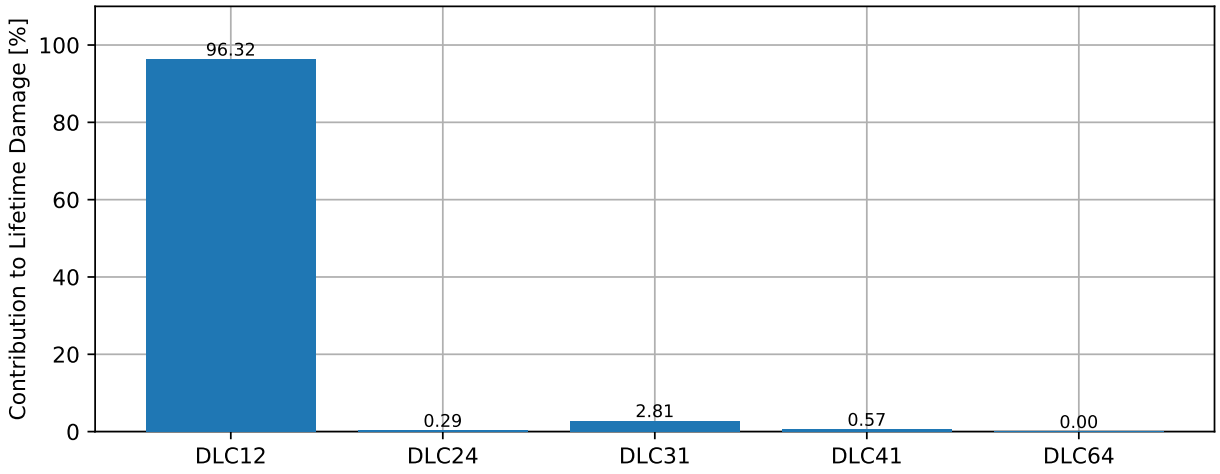
LSSTipMza_[kN-m]

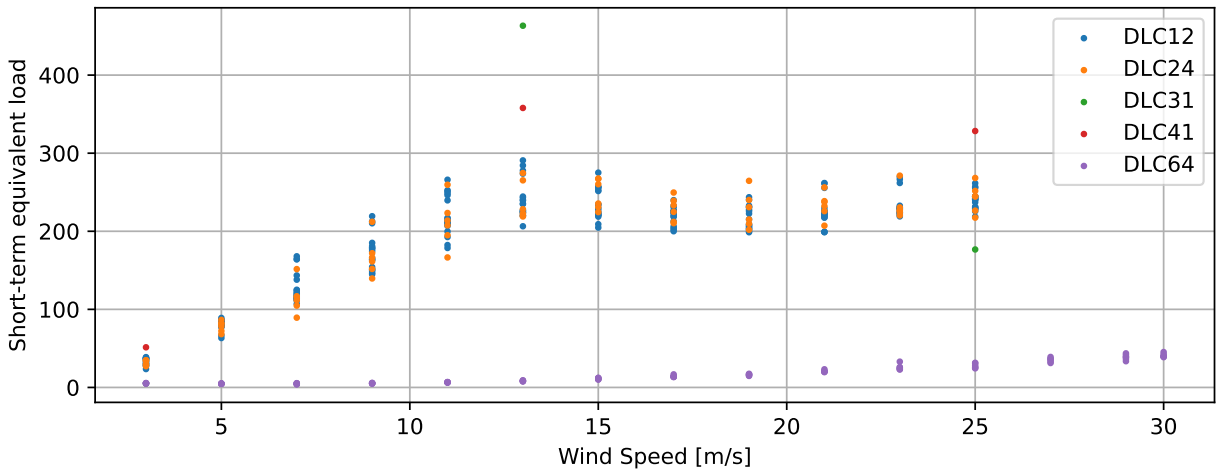


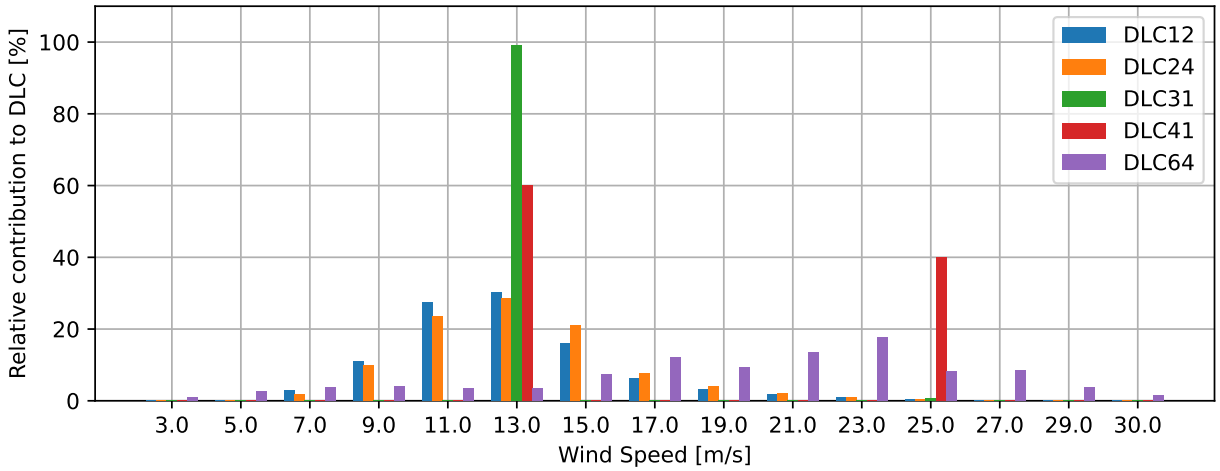




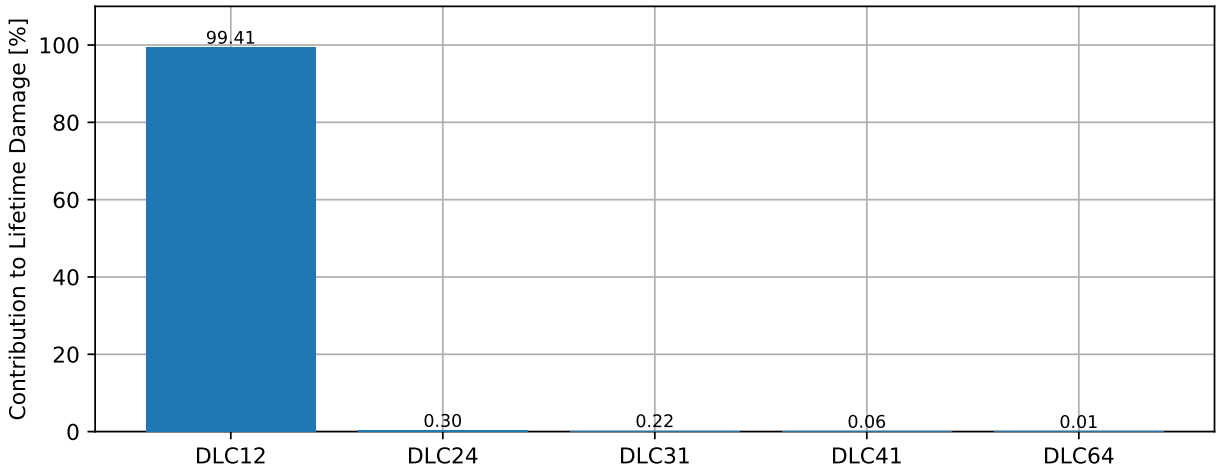
LSShftFxa_[kN]

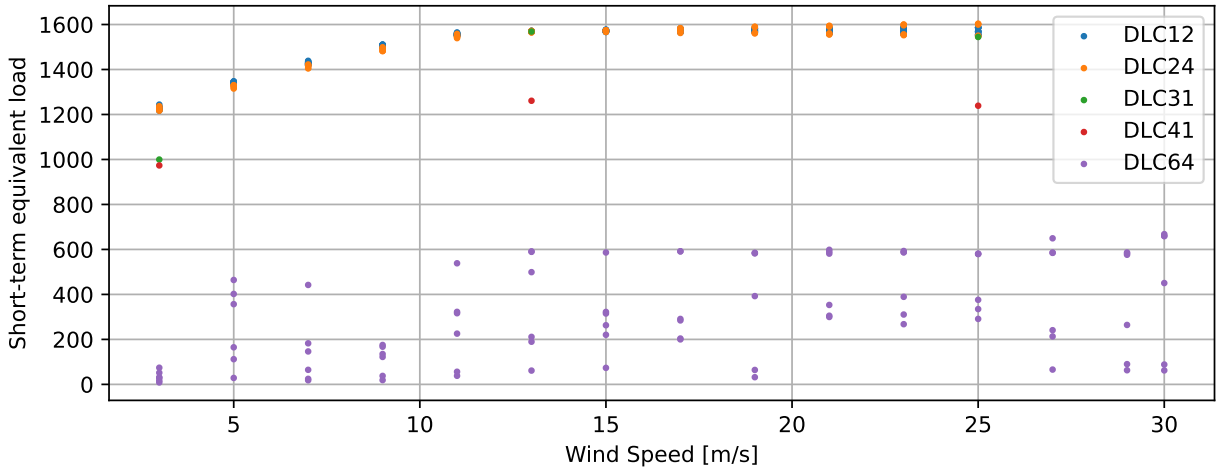


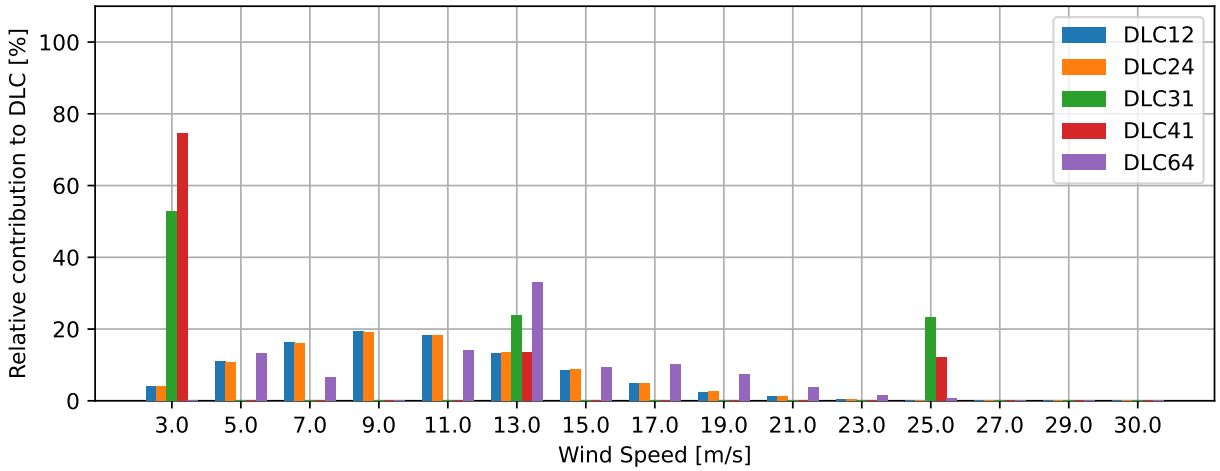




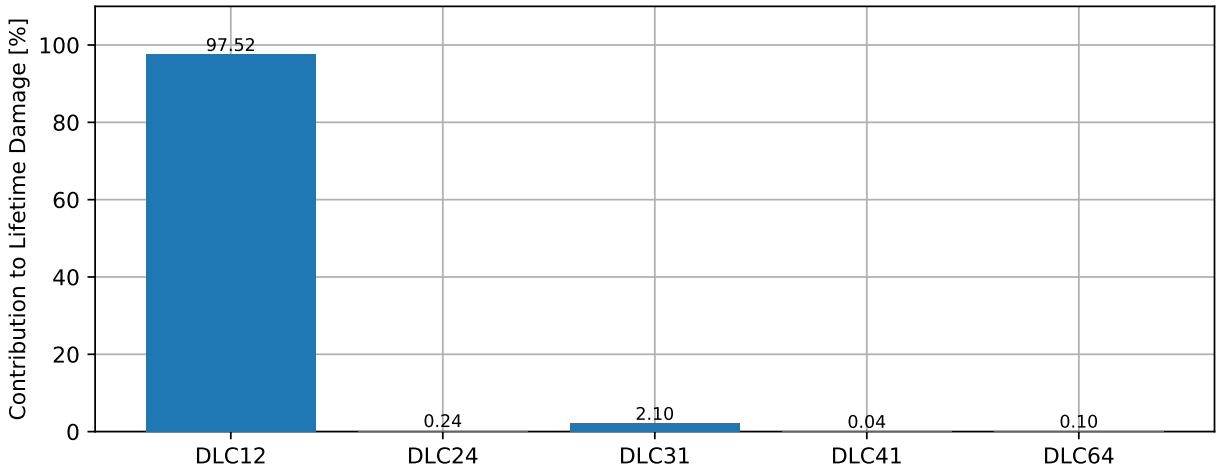
LSShftFya_[kN]

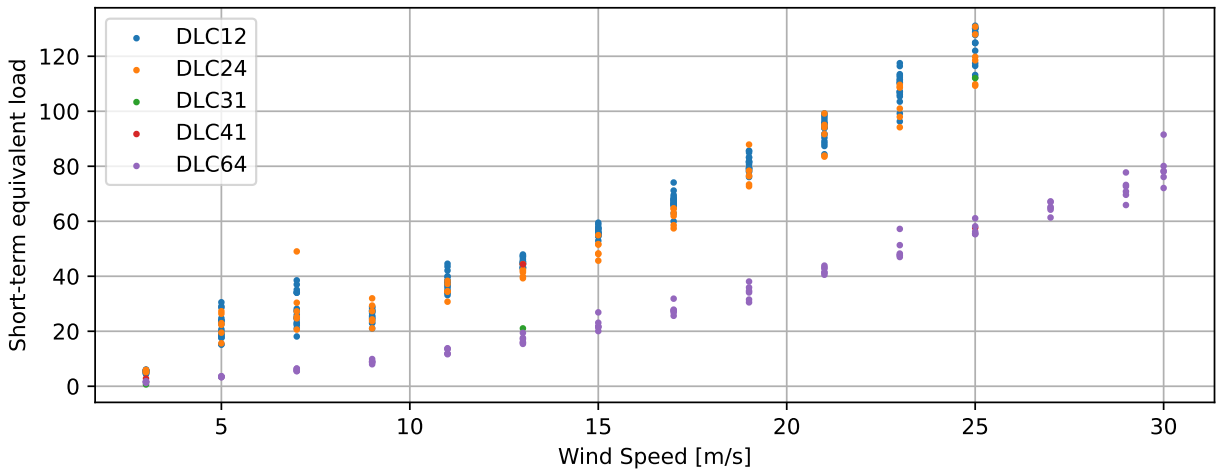


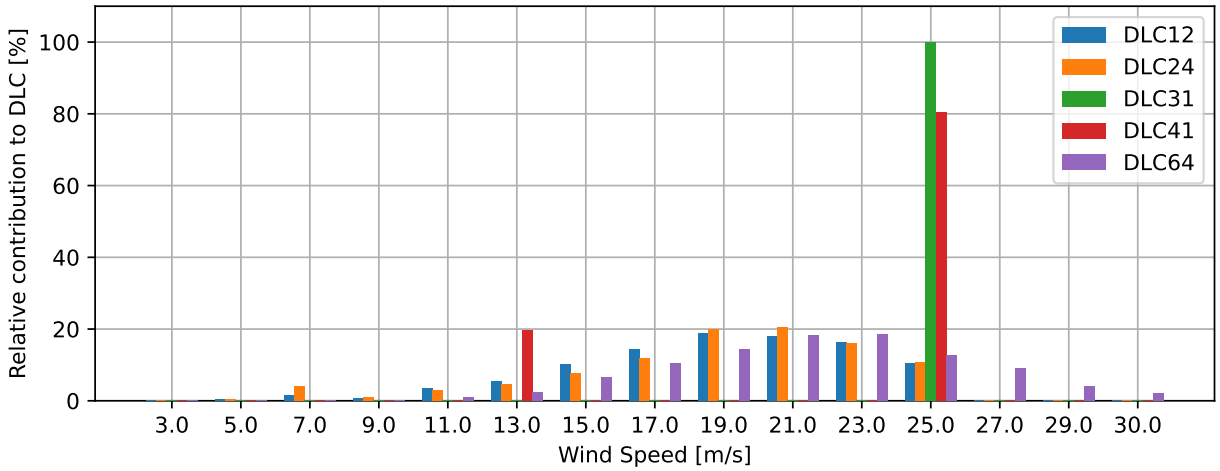




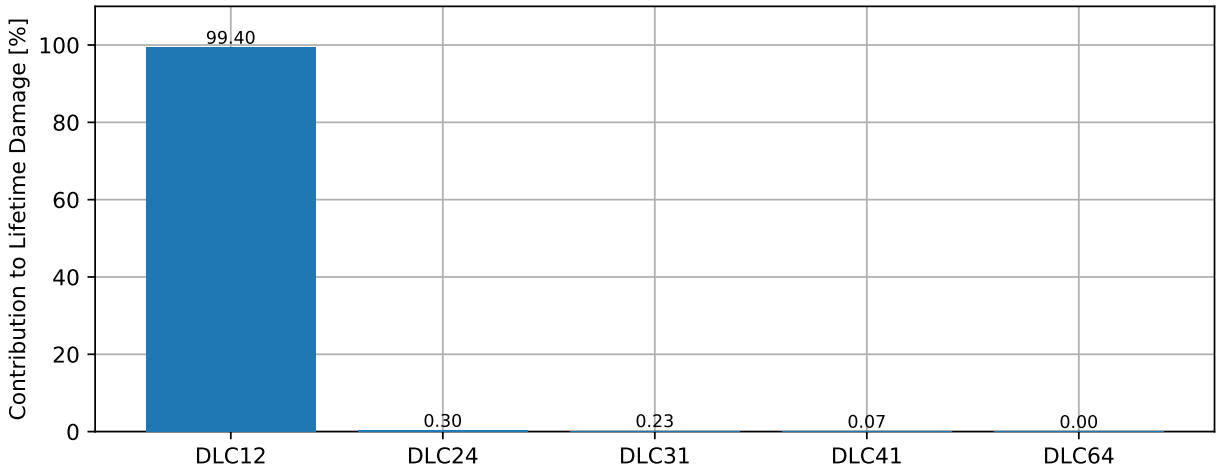
LSShftFys_[kN]

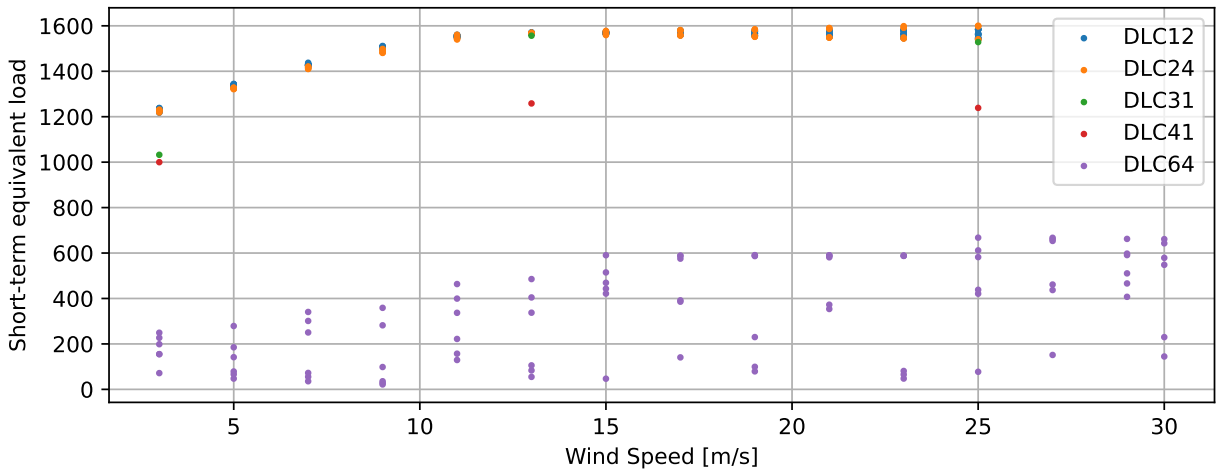


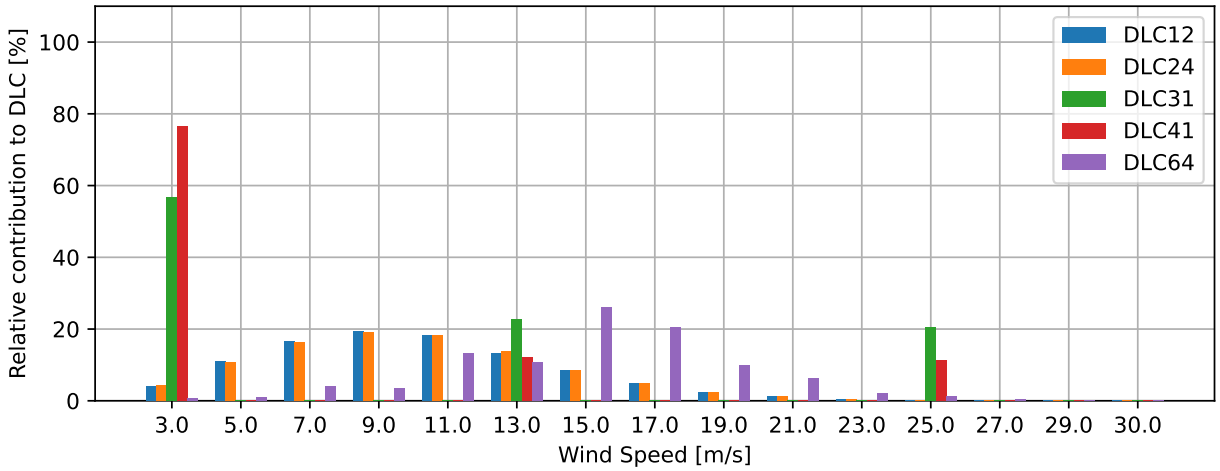




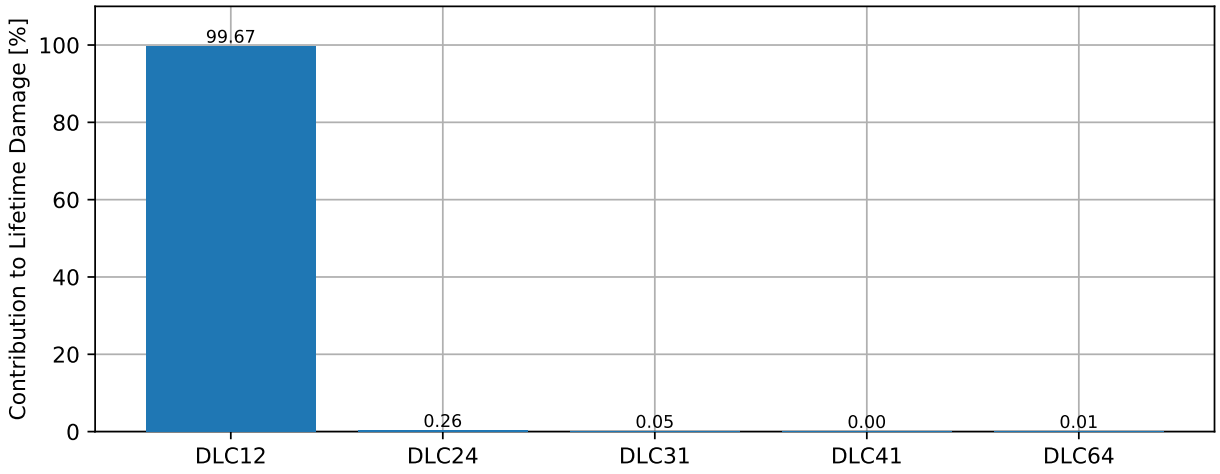
LSShftFza_[kN]

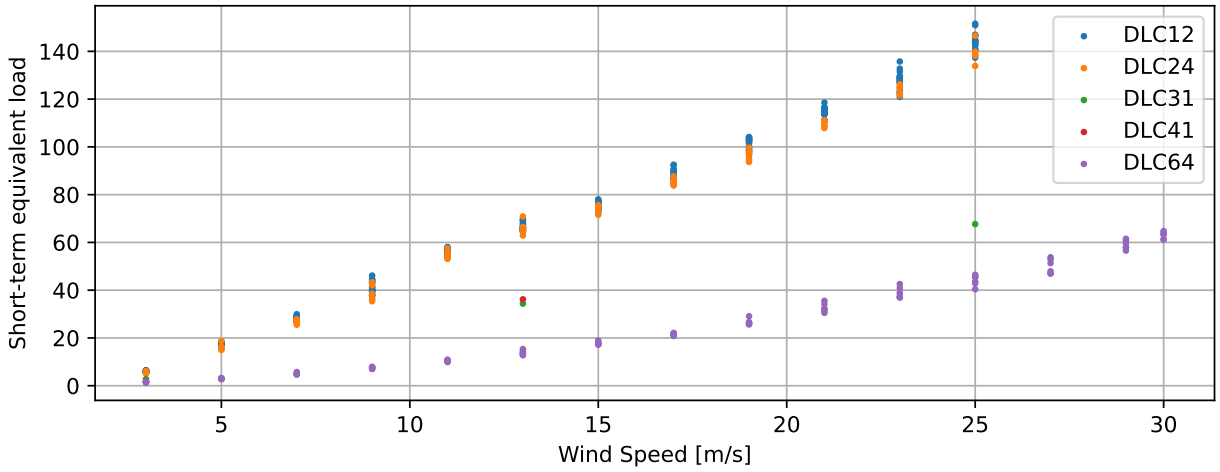


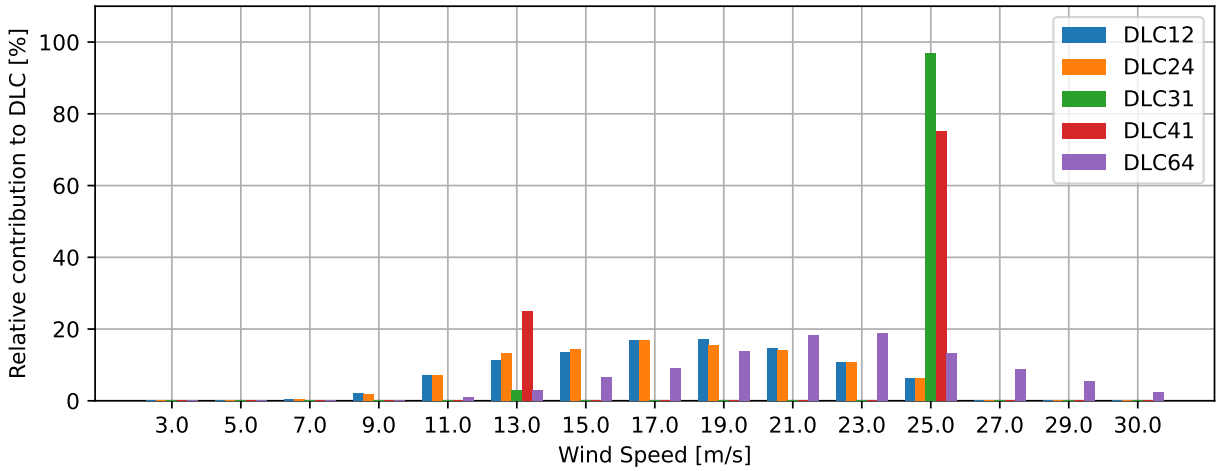




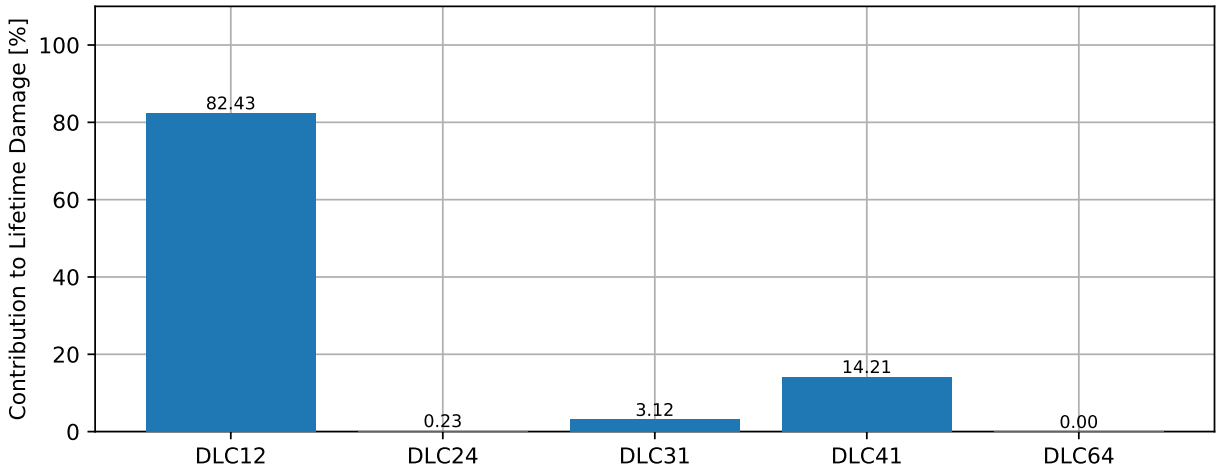
LSShftFzs_[kN]

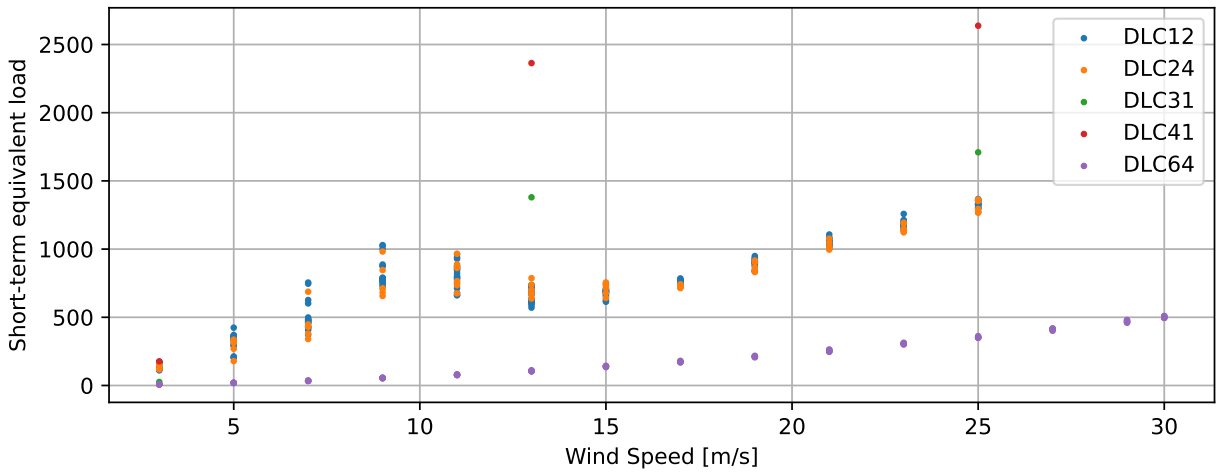


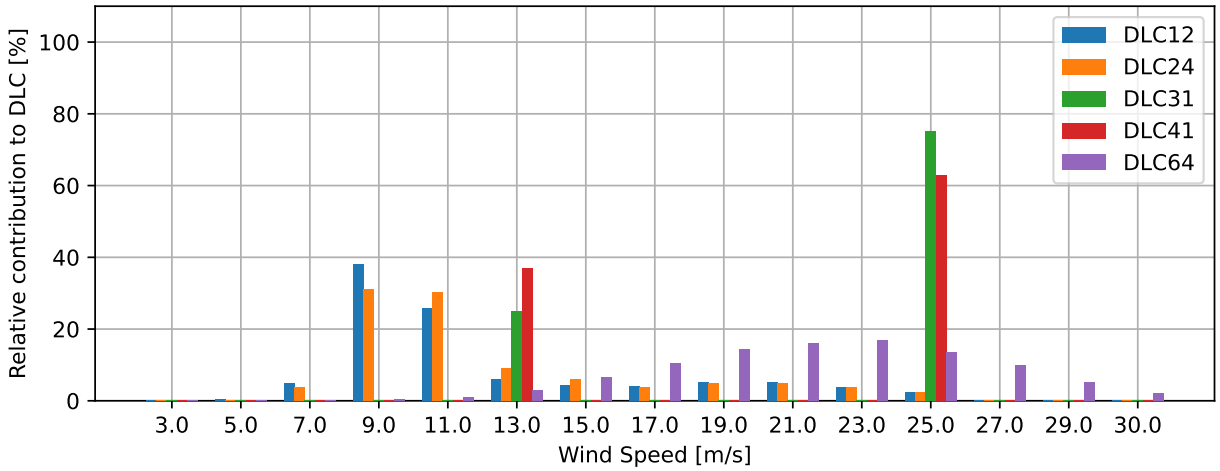




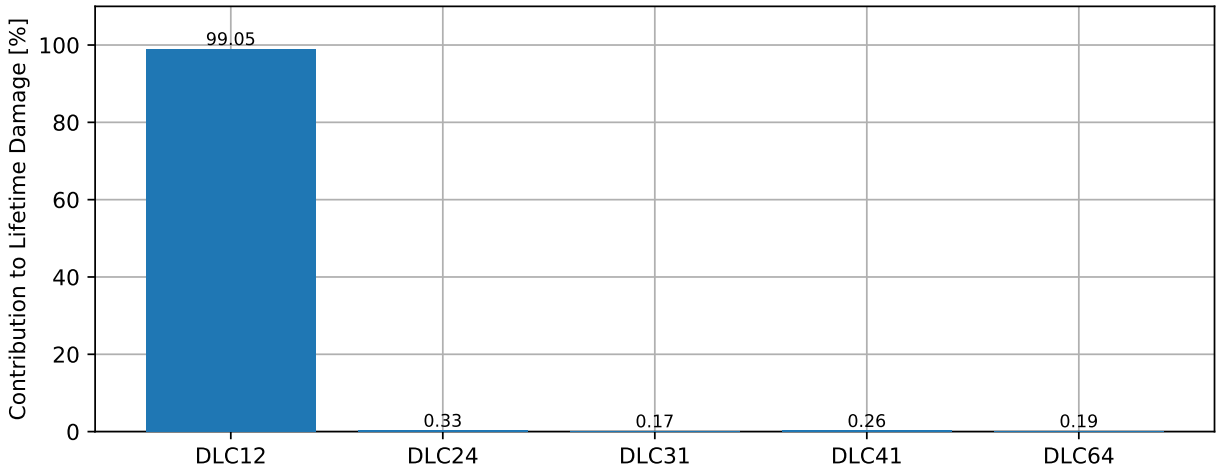
LSShftMxa_[kN-m]

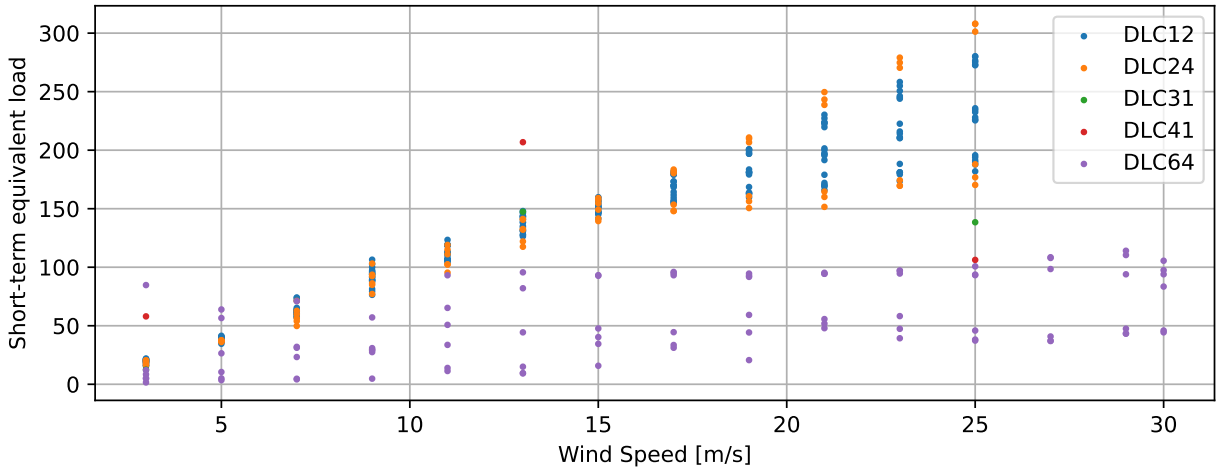


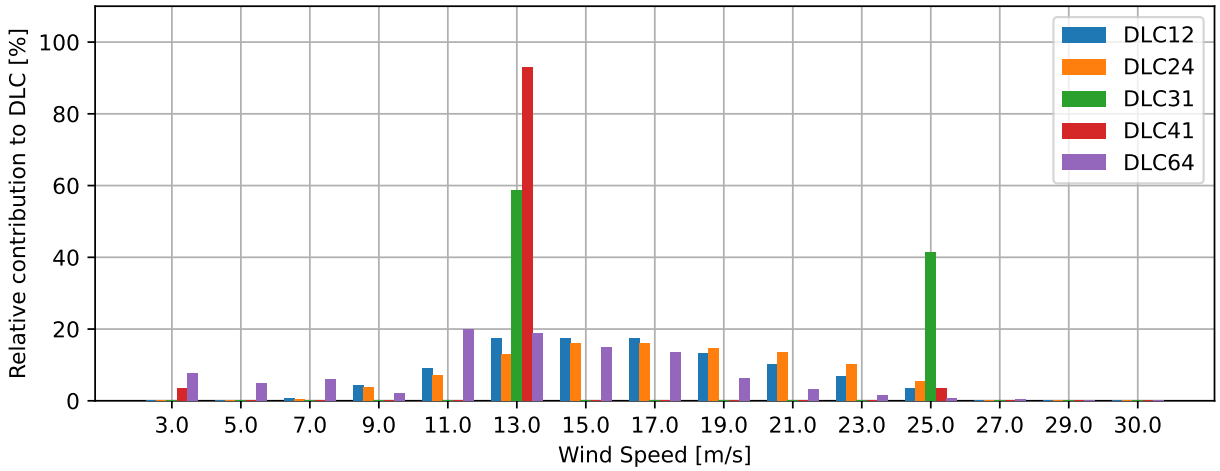




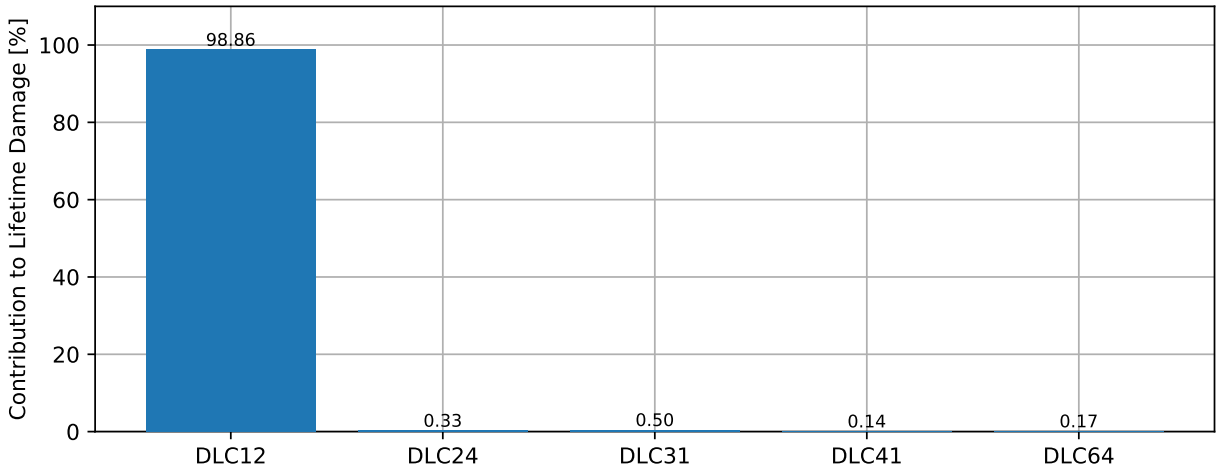
RootFxb1_[kN]

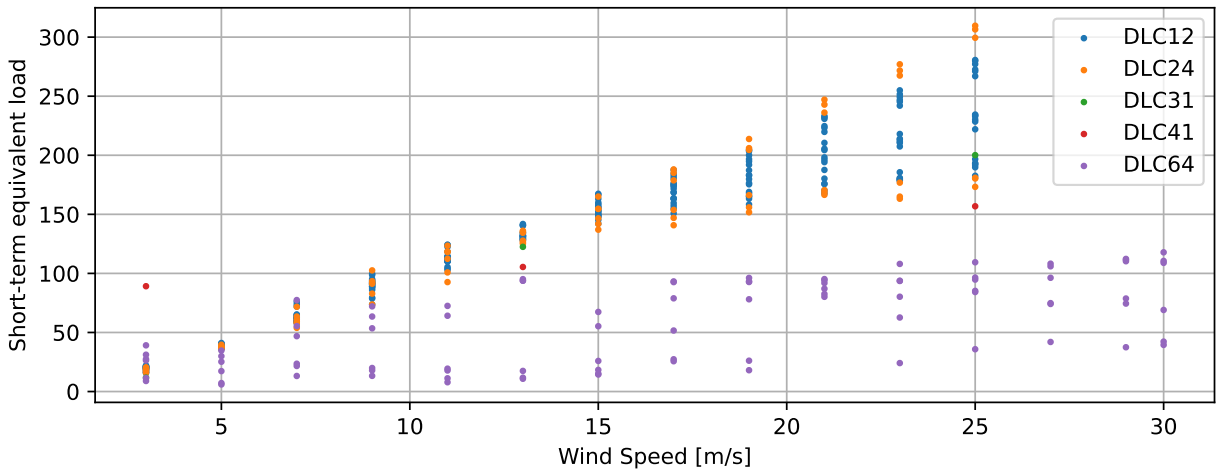

Contribution to Lifetime Damage [%]
99.05
0.33
0.17
0.26
0.19
DLC12
DLC24
DLC31
DLC41
DLC64

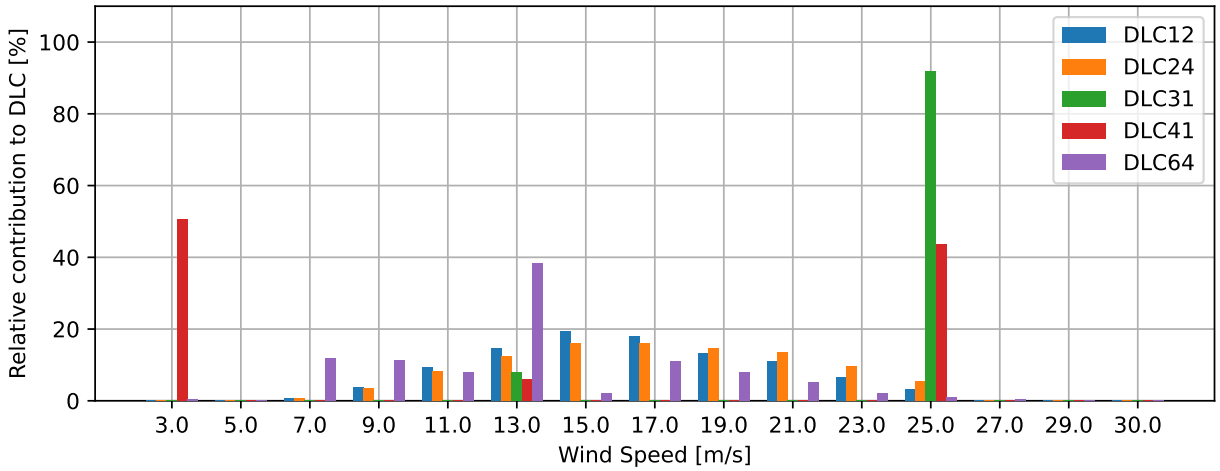

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

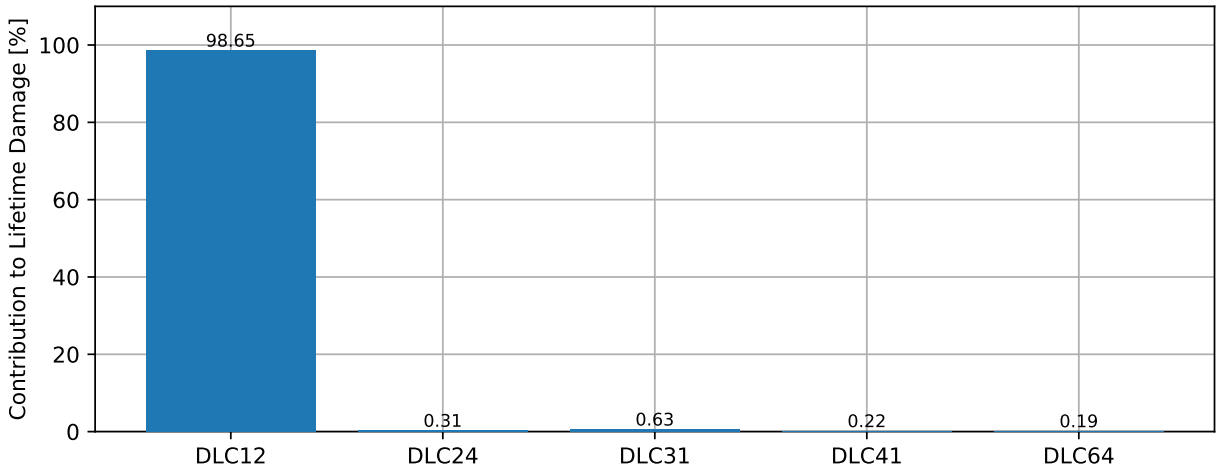
RootFxb2_[kN]

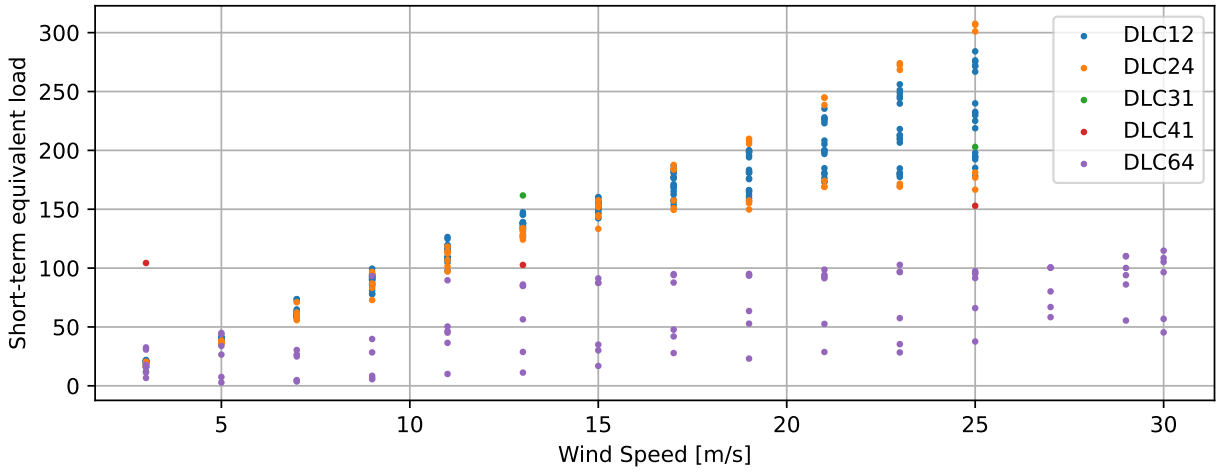

Contribution to Lifetime Damage [%]
98.86
0.33
0.50
0.14
0.17
DLC12
DLC24
DLC31
DLC41
DLC64

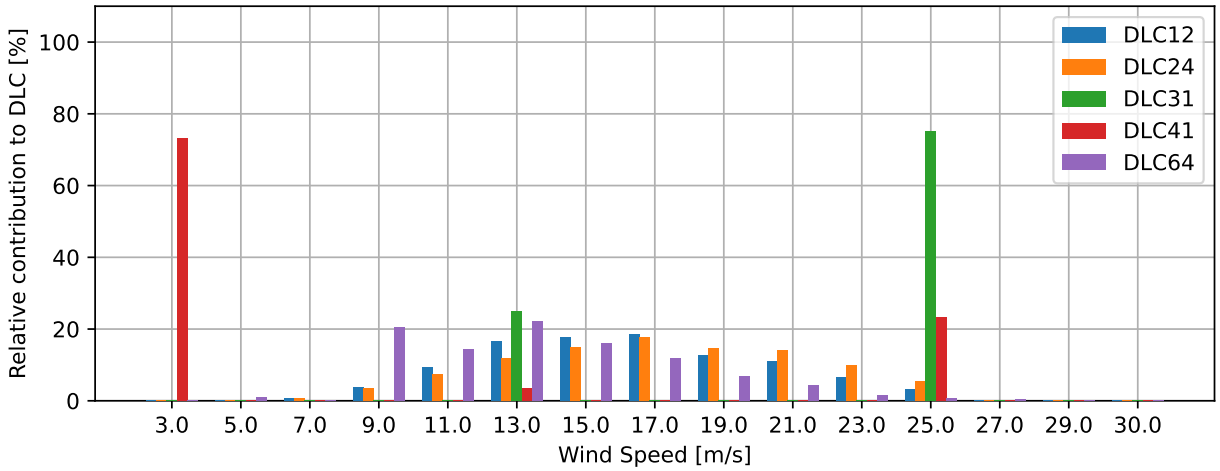

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

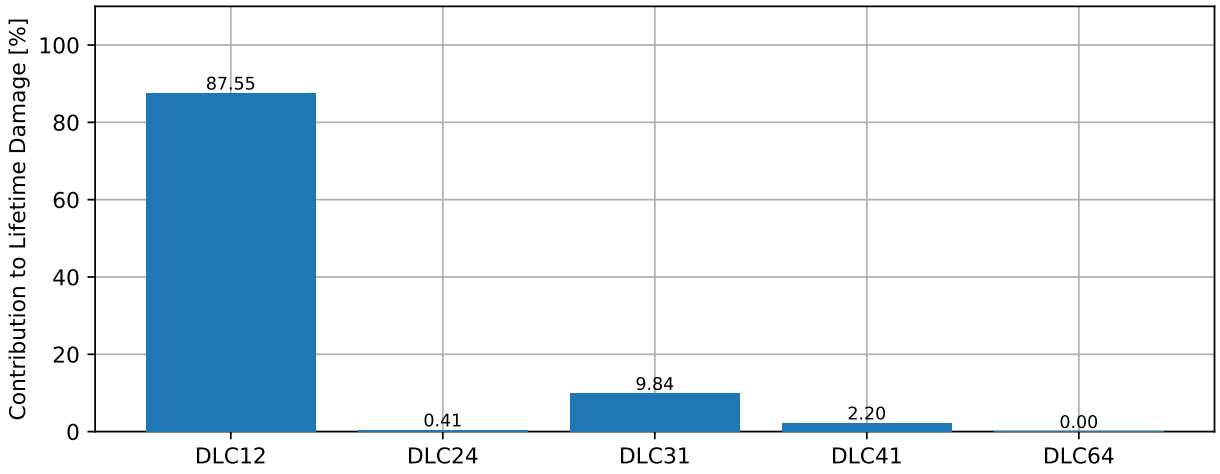
RootFxb3_[kN]

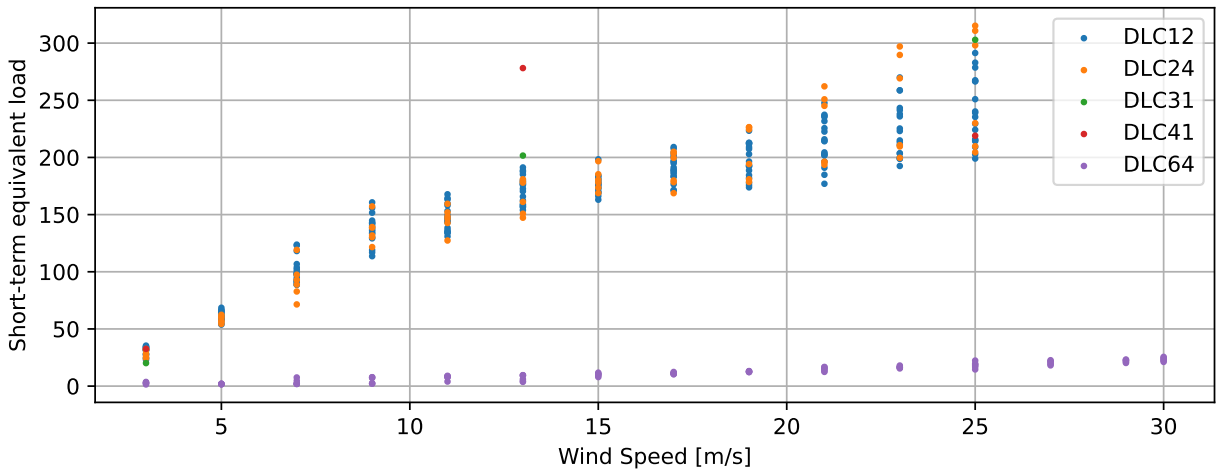

Contribution to Lifetime Damage [%]
98.65
0.31
0.63
0.22
0.19
DLC12
DLC24
DLC31
DLC41
DLC64

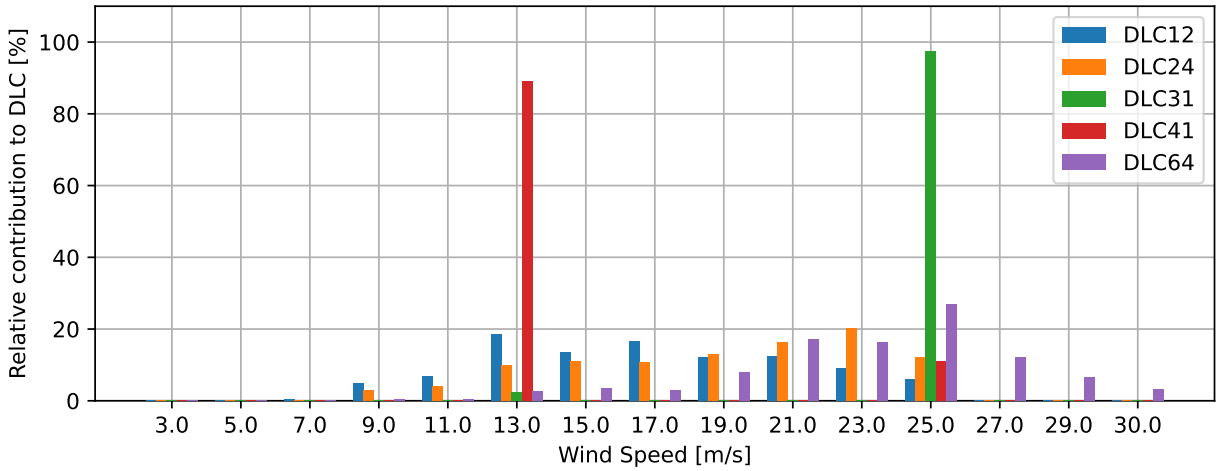

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

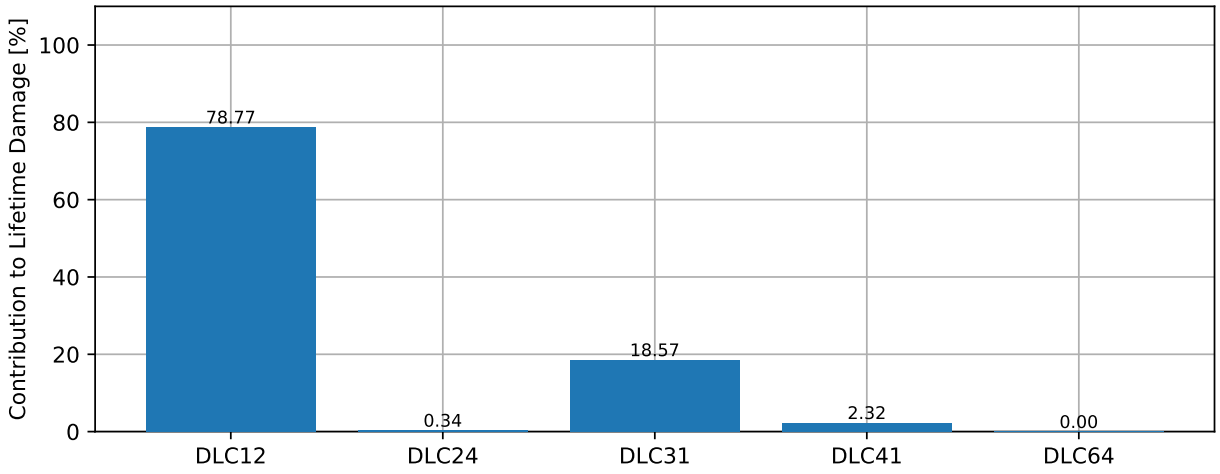
RootFxc1_[kN]

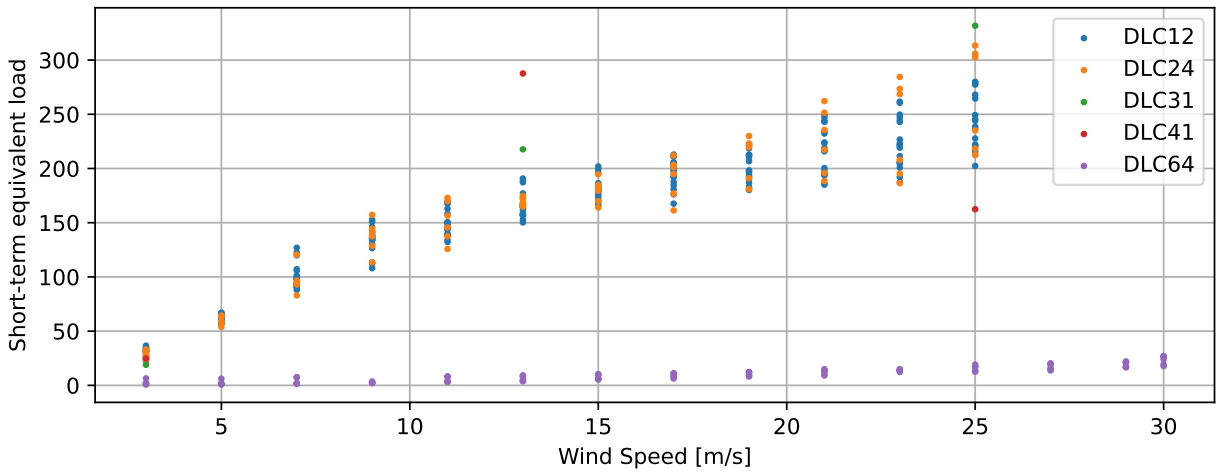

Contribution to Lifetime Damage [%]
87.55
0.41
9.84
2.20
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

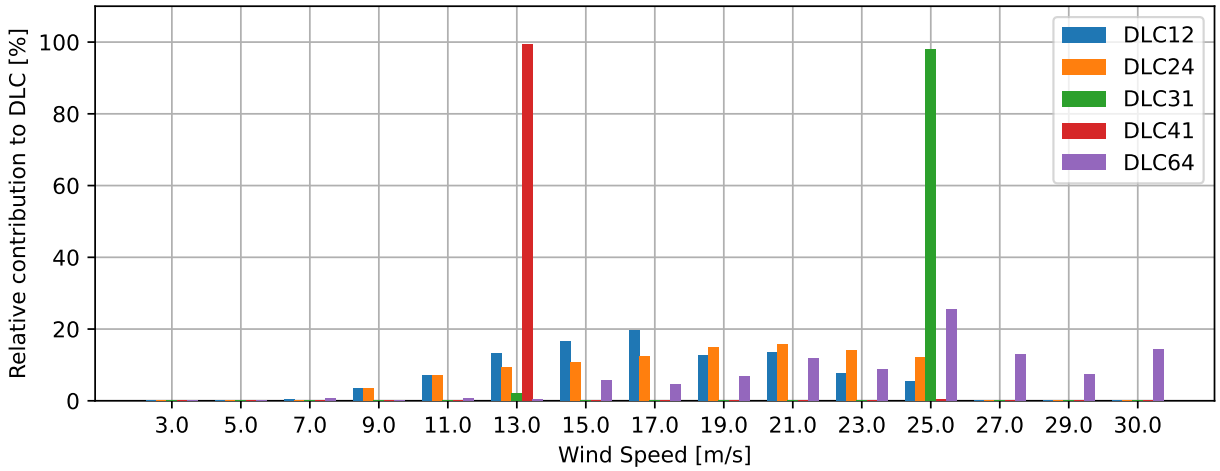

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

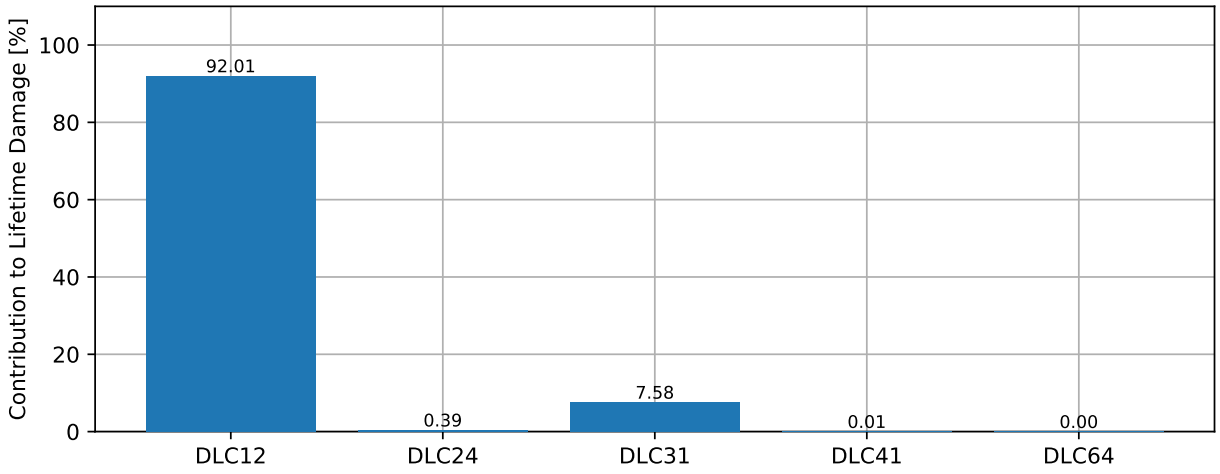
RootFxc2_[kN]

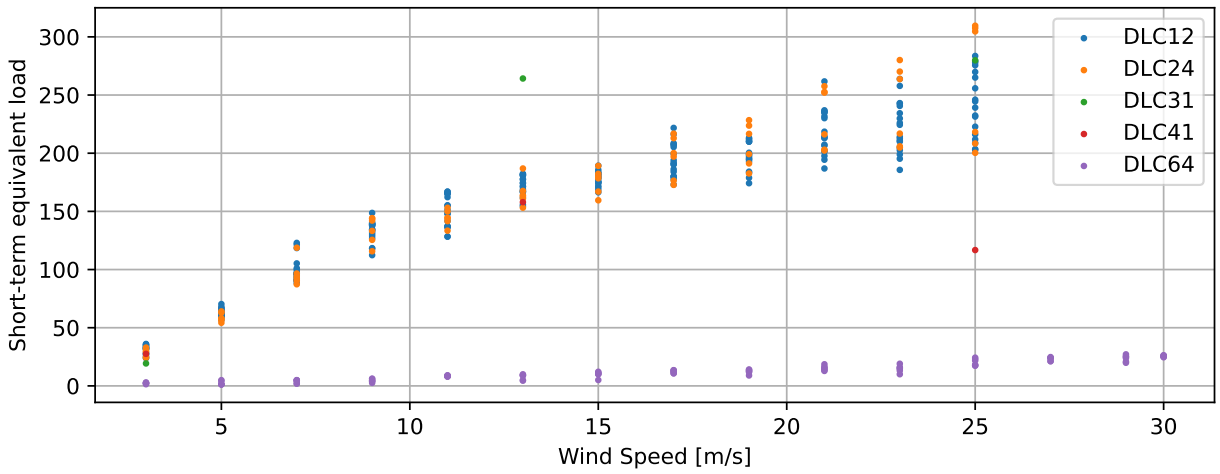

Contribution to Lifetime Damage [%]
78.77
0.34
18.57
2.32
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

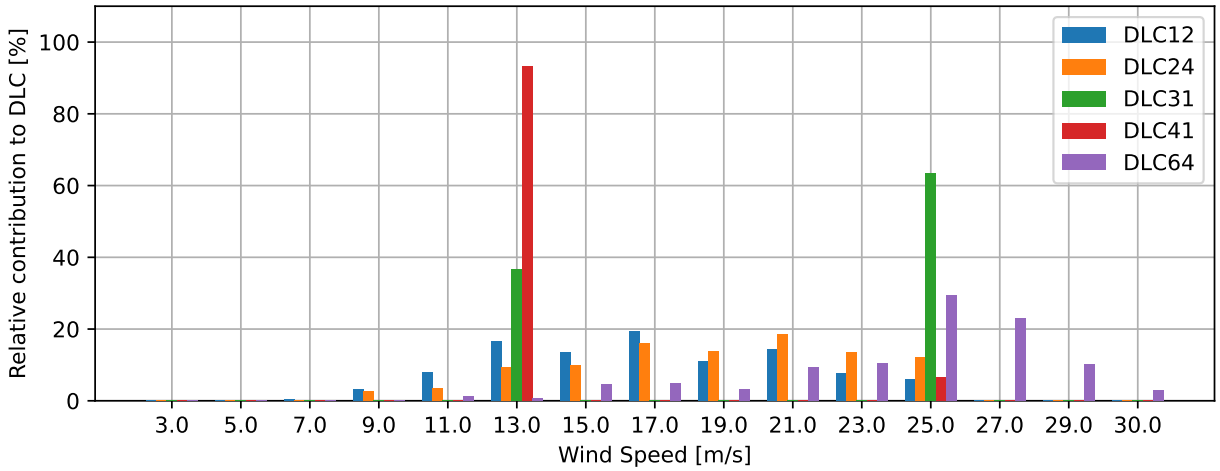

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

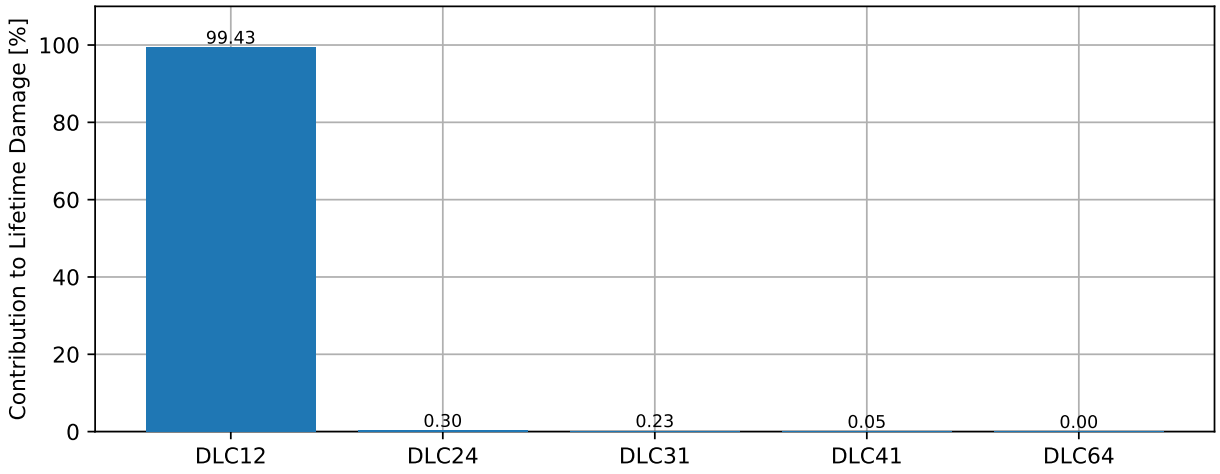
RootFxc3_[kN]

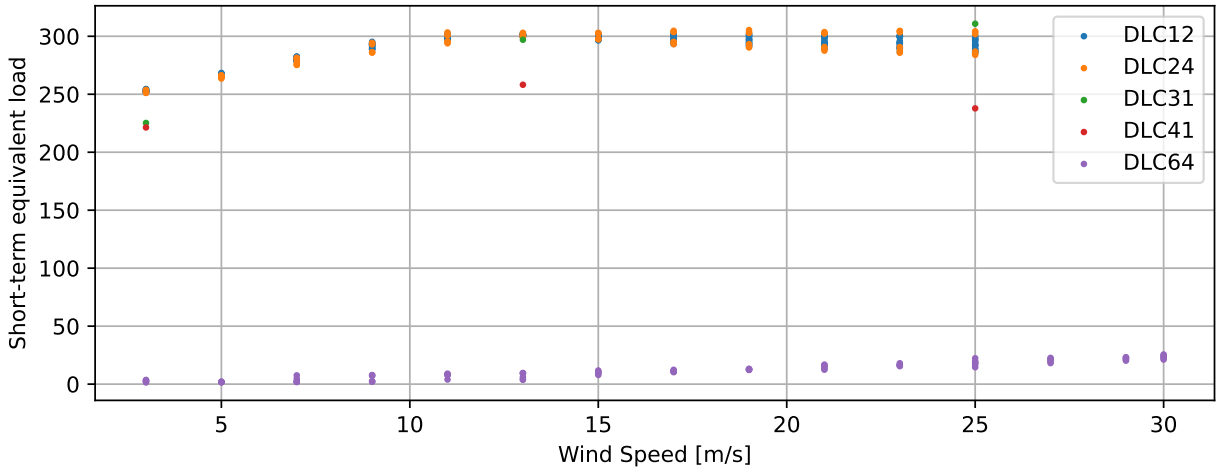

Contribution to Lifetime Damage [%]
92.01
0.39
7.58
0.01
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

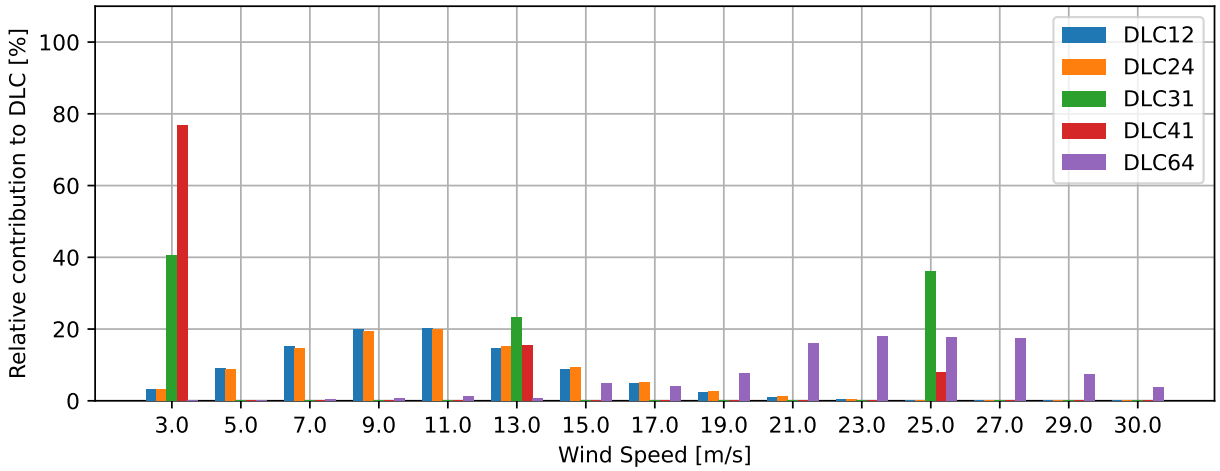

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

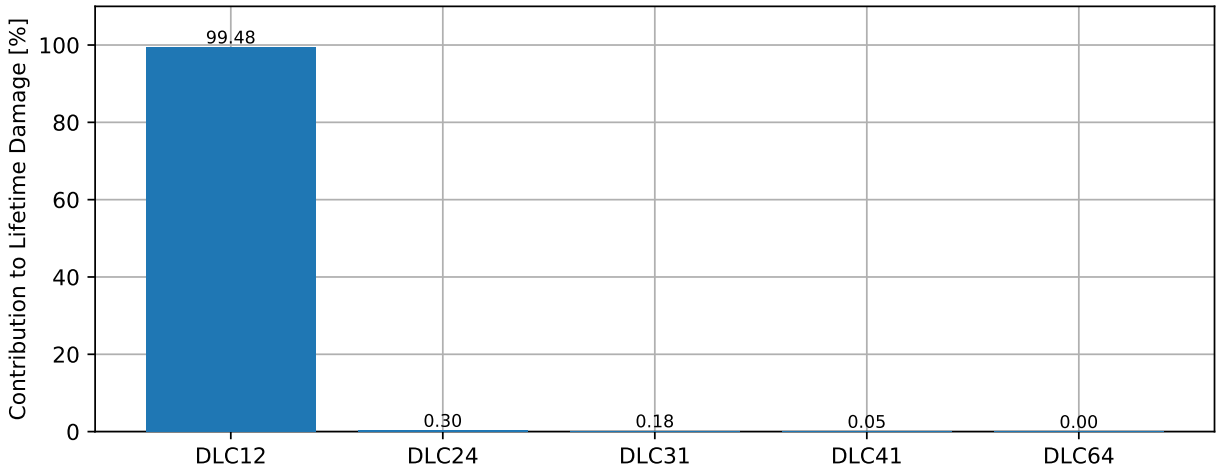
RootFyb1_[kN]

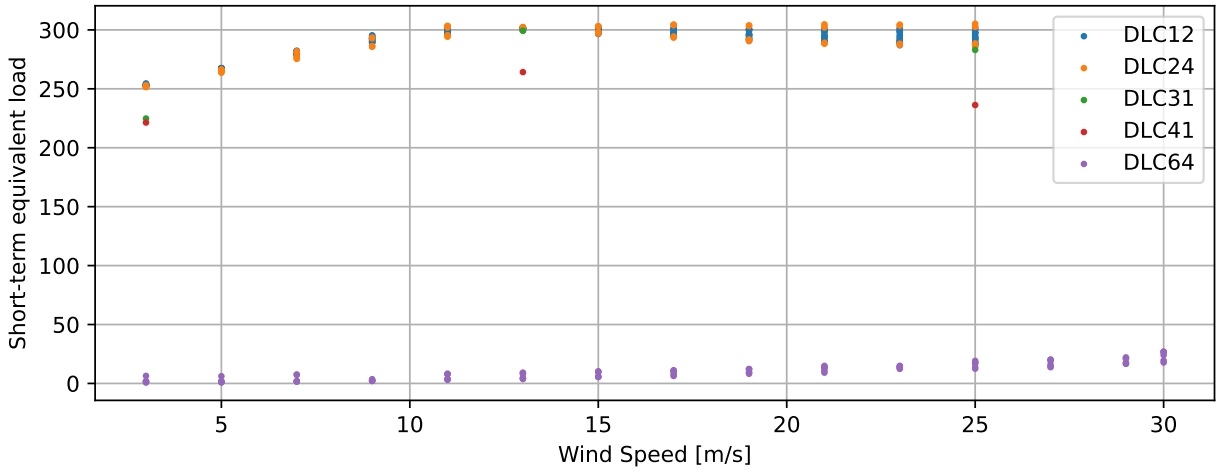

Contribution to Lifetime Damage [%]
99.43
0.30
0.23
0.05
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

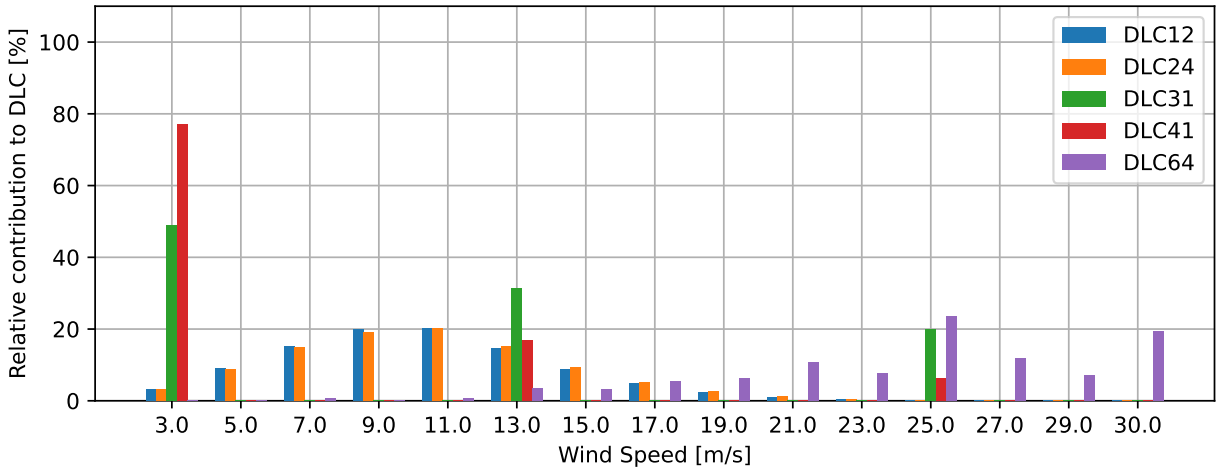

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

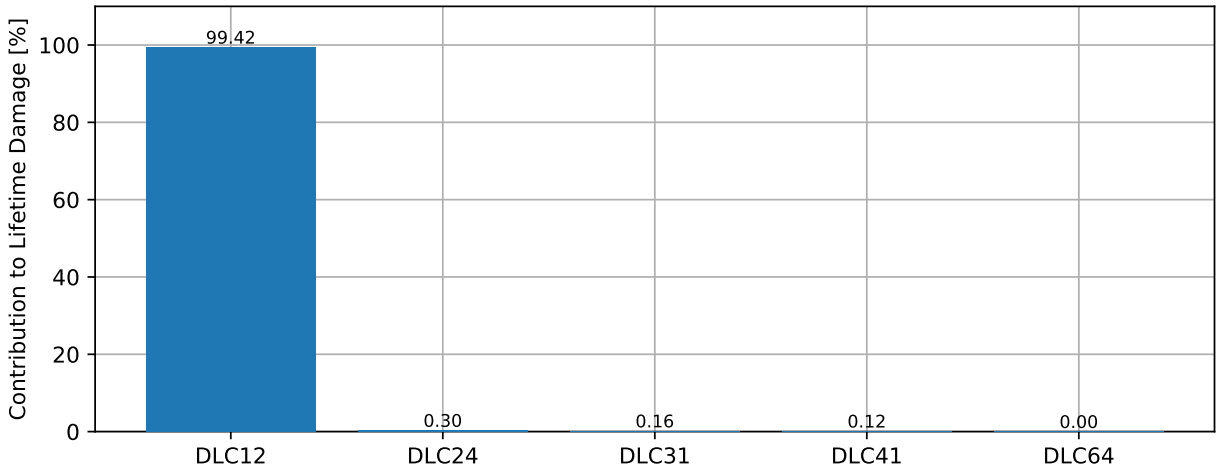
RootFyb2_[kN]

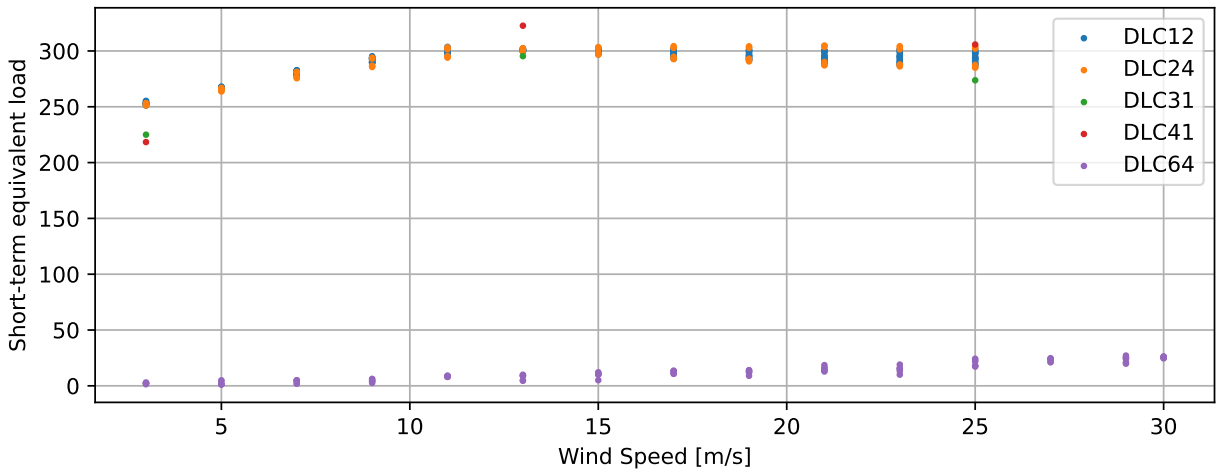

Contribution to Lifetime Damage [%]
99.48
0.30
0.18
0.05
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

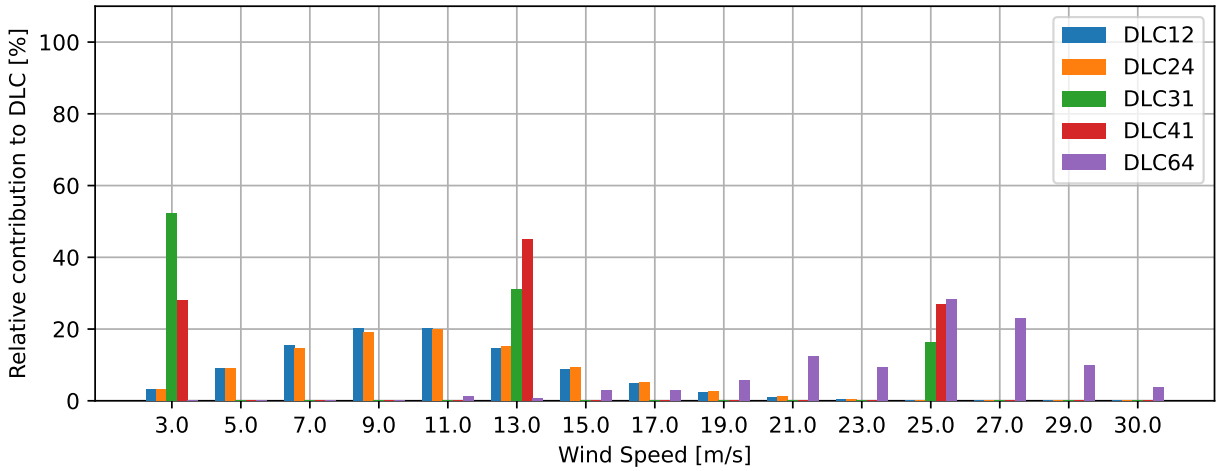

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

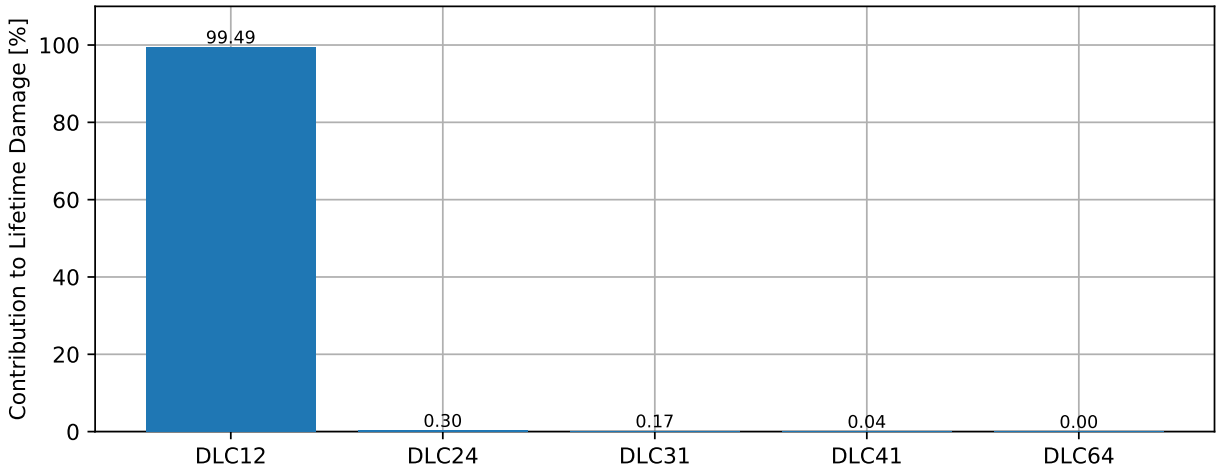
RootFyb3_[kN]

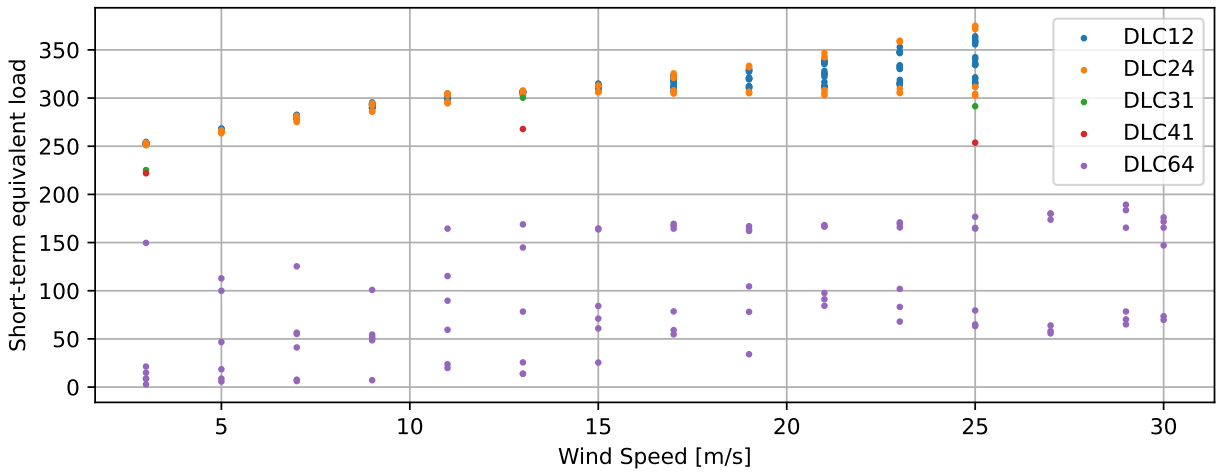

Contribution to Lifetime Damage [%]
99.42
0.30
0.16
0.12
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

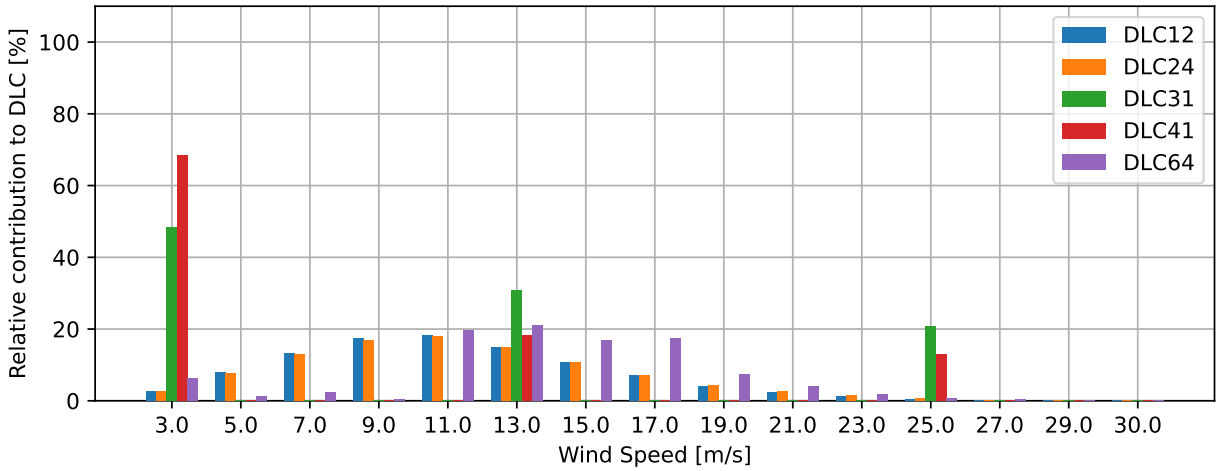

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

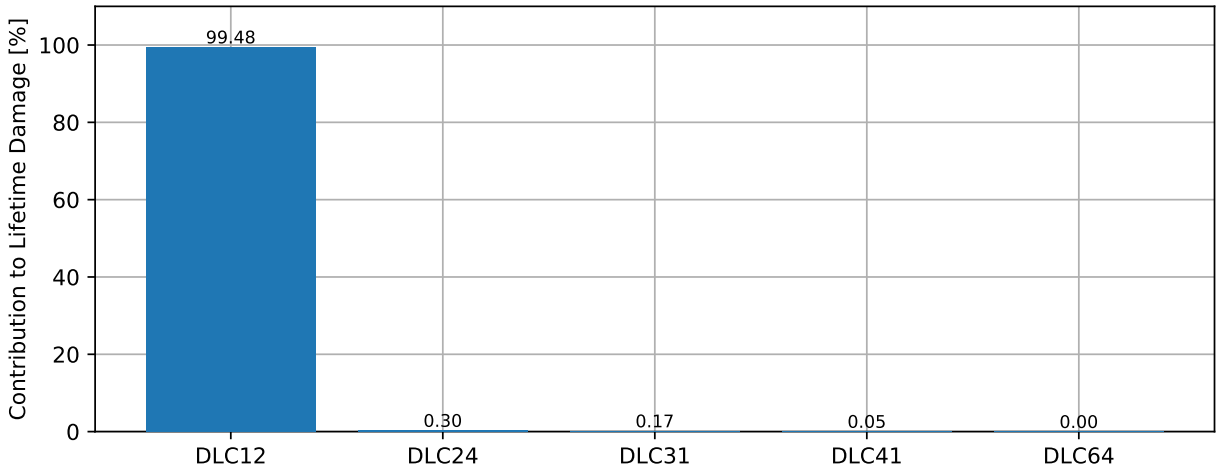
RootFyc1_[kN]

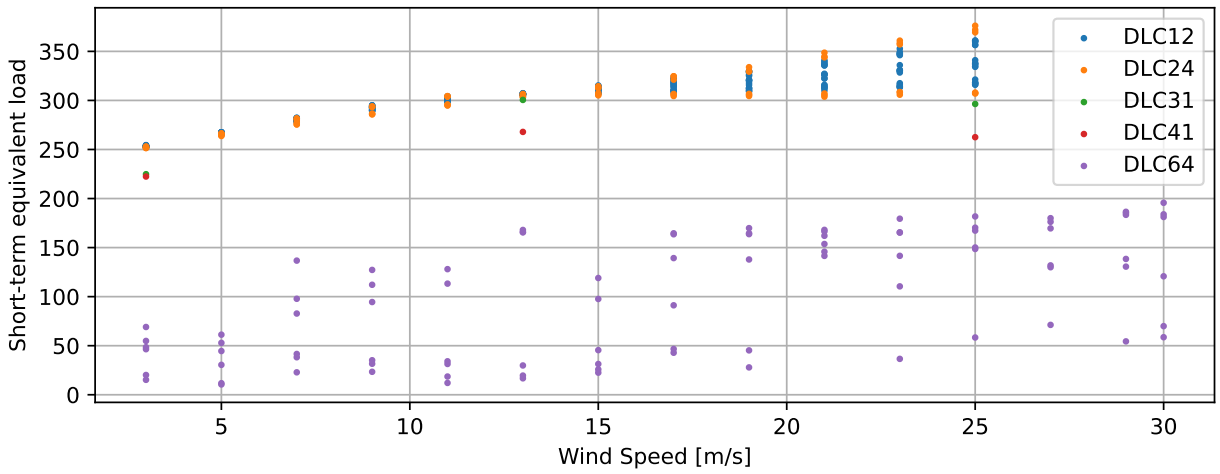

Contribution to Lifetime Damage [%]
99.49
0.30
0.17
0.04
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

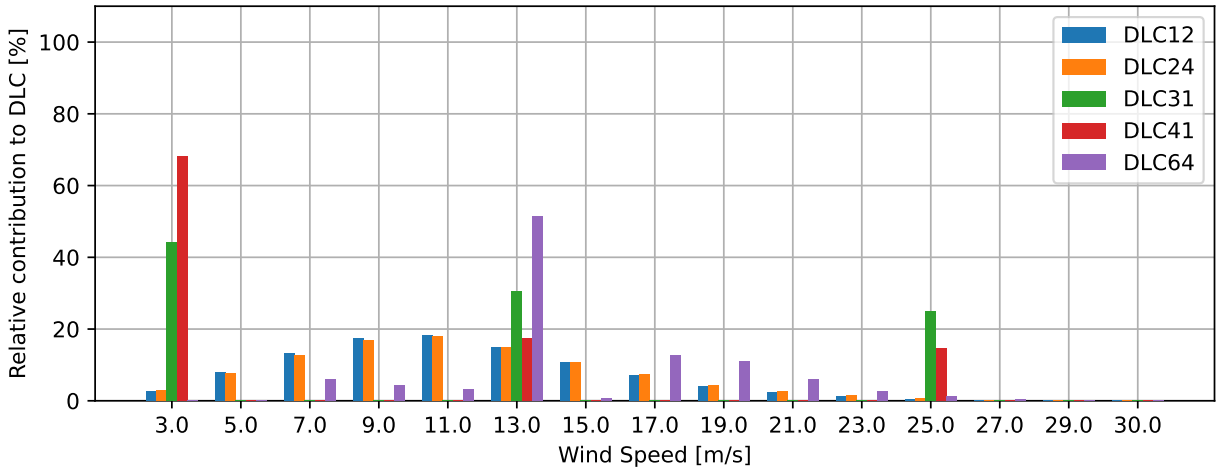

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

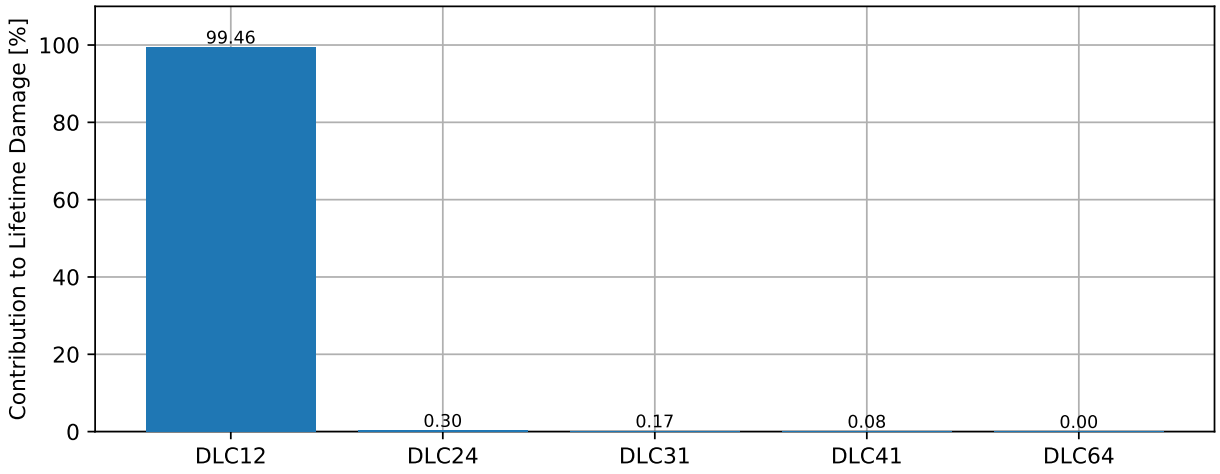
RootFyc2_[kN]

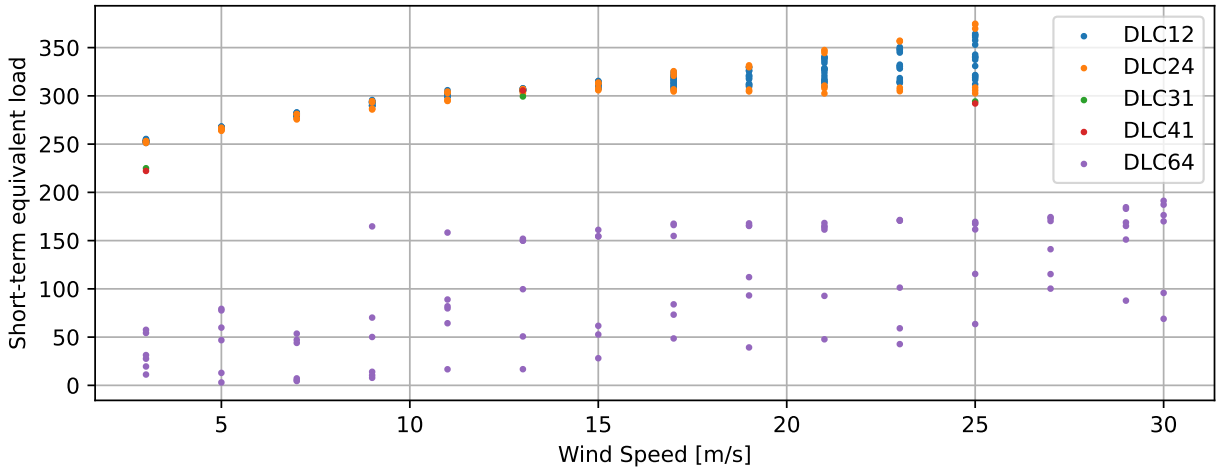

Contribution to Lifetime Damage [%]
99.48
0.30
0.17
0.05
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

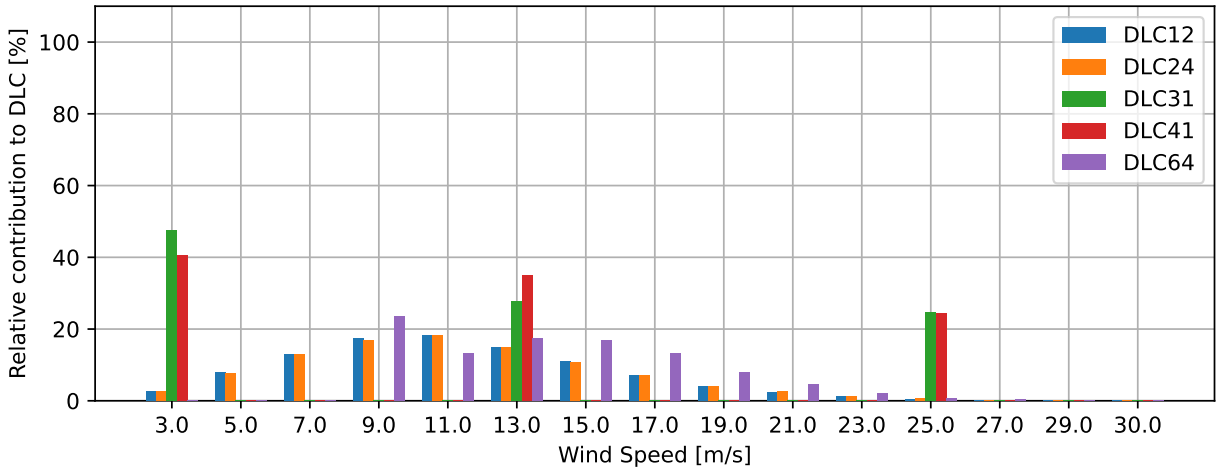

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

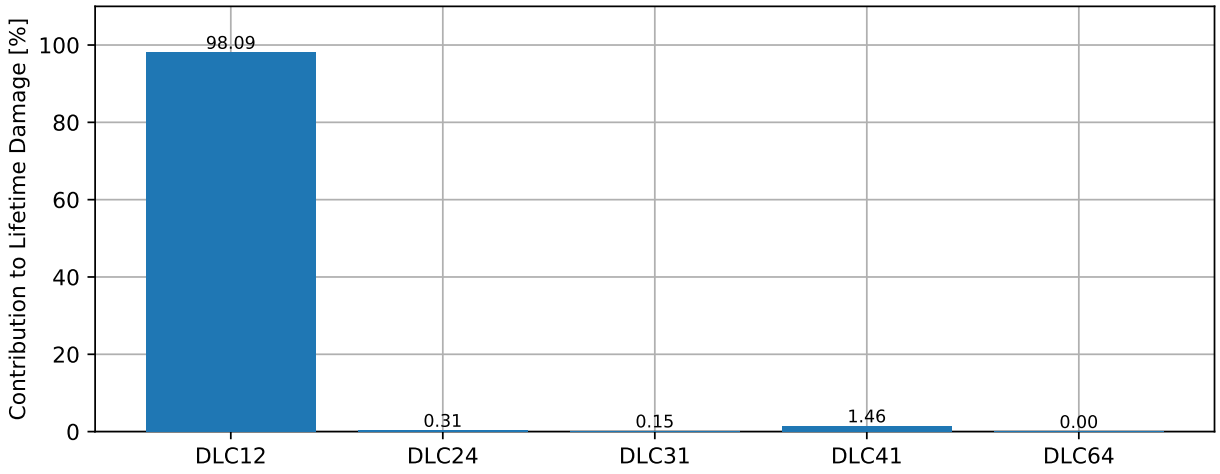
RootFyc3_[kN]

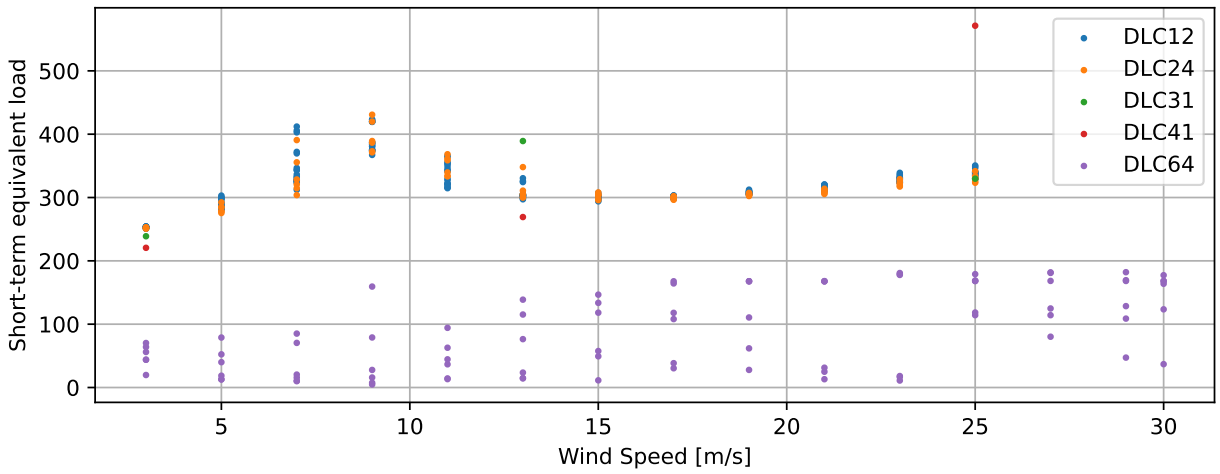

Contribution to Lifetime Damage [%]
99.46
0.30
0.17
0.08
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

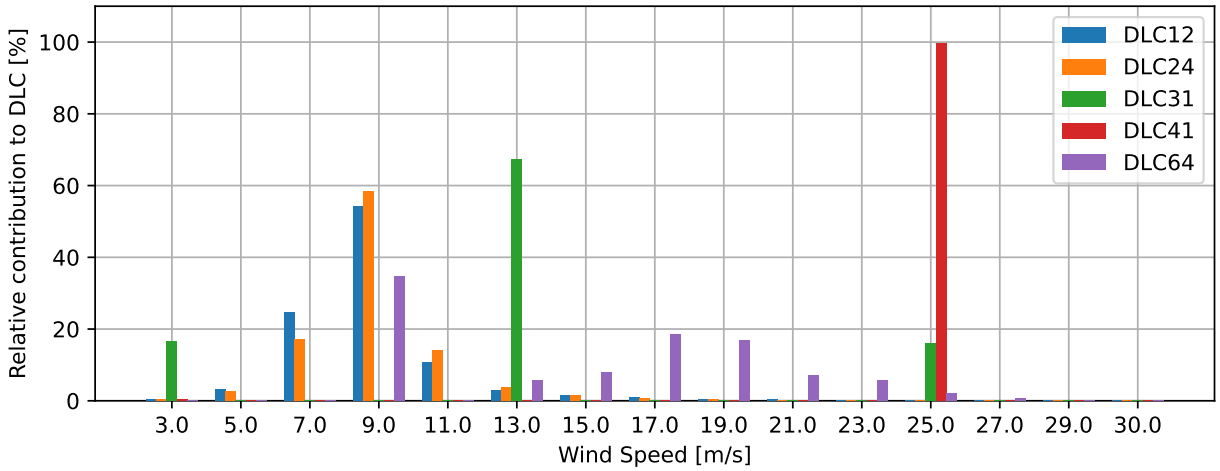

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

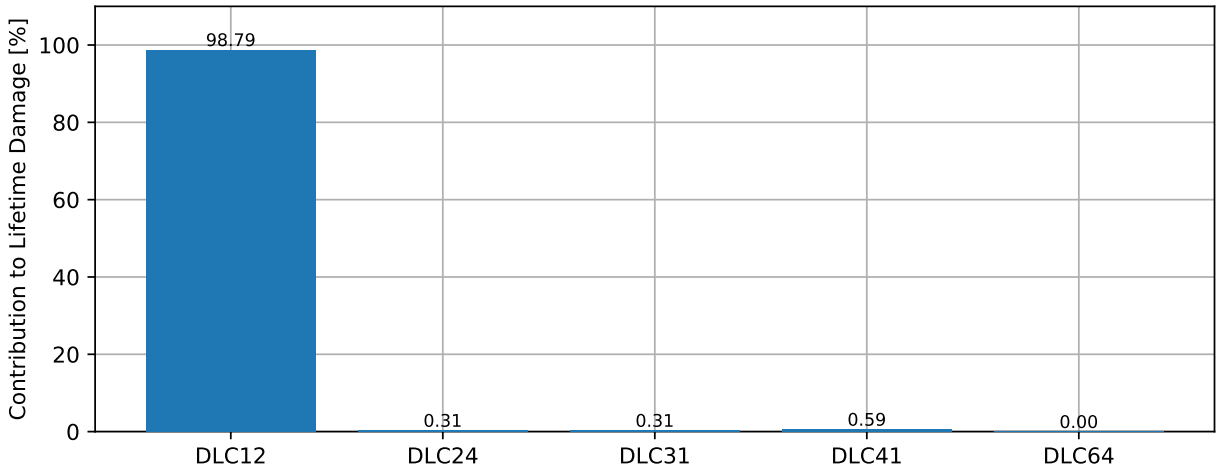
RootFzc1_[kN]

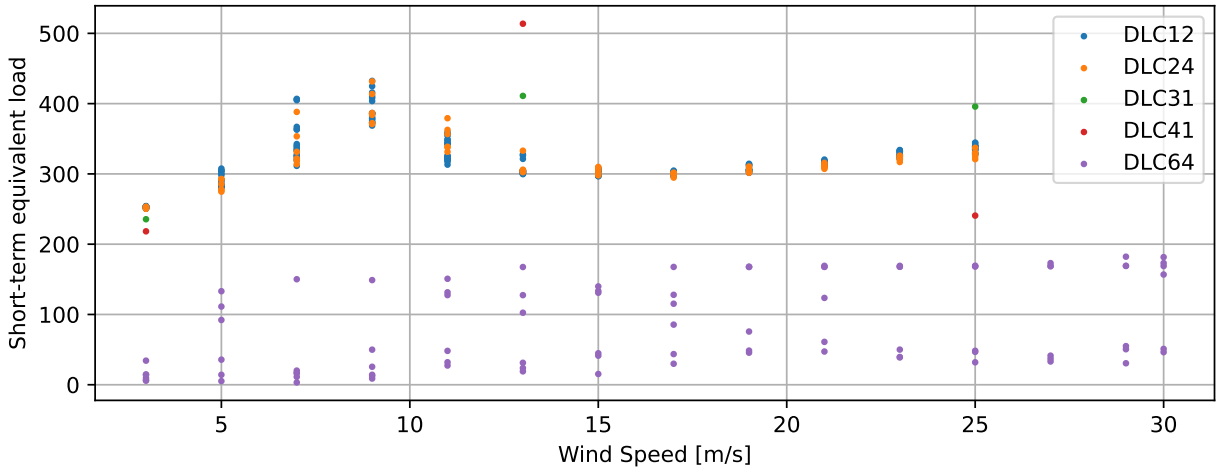

Contribution to Lifetime Damage [%]
98.09
0.31
0.15
1.46
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

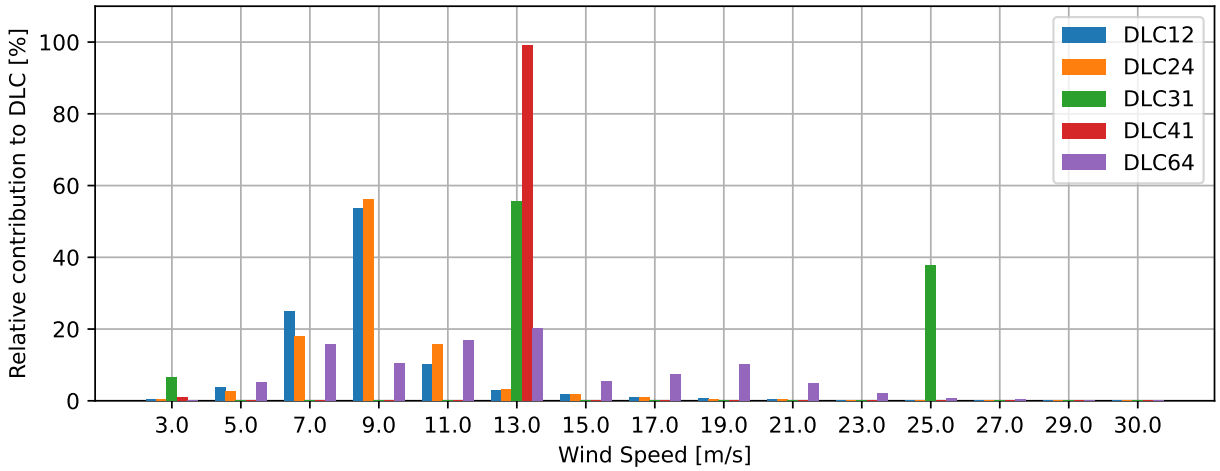

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

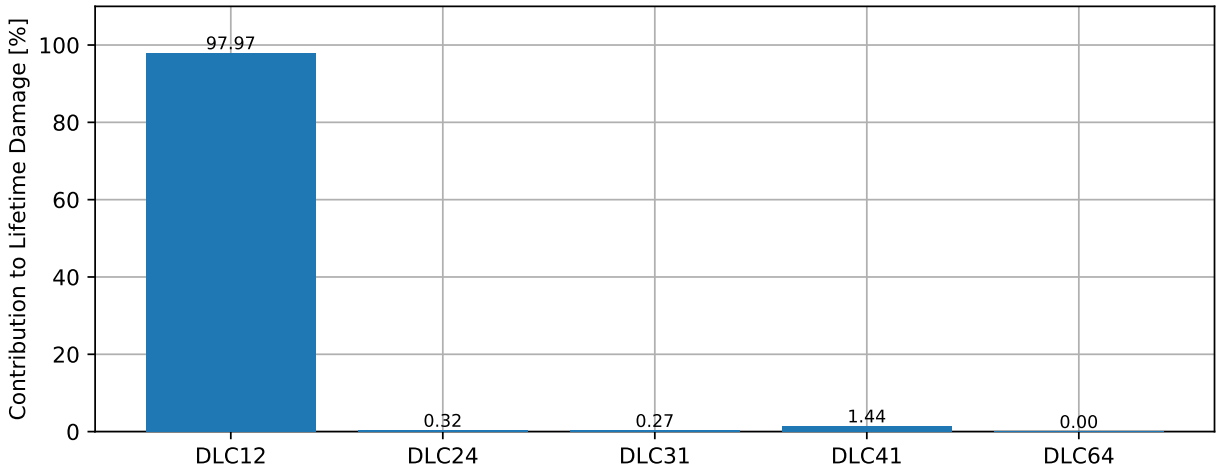
RootFzc2_[kN]

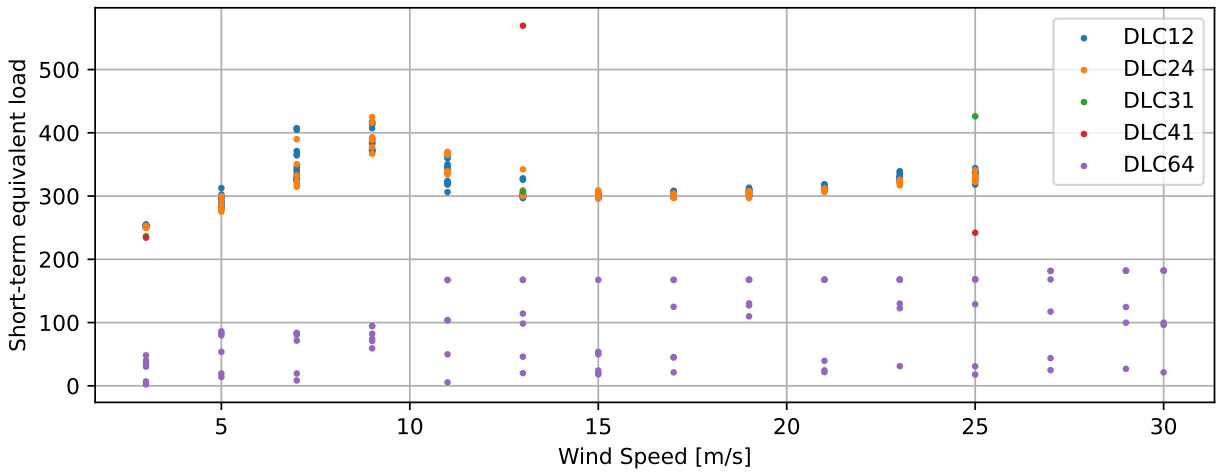

Contribution to Lifetime Damage [%]
98.79
0.31
0.31
0.59
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

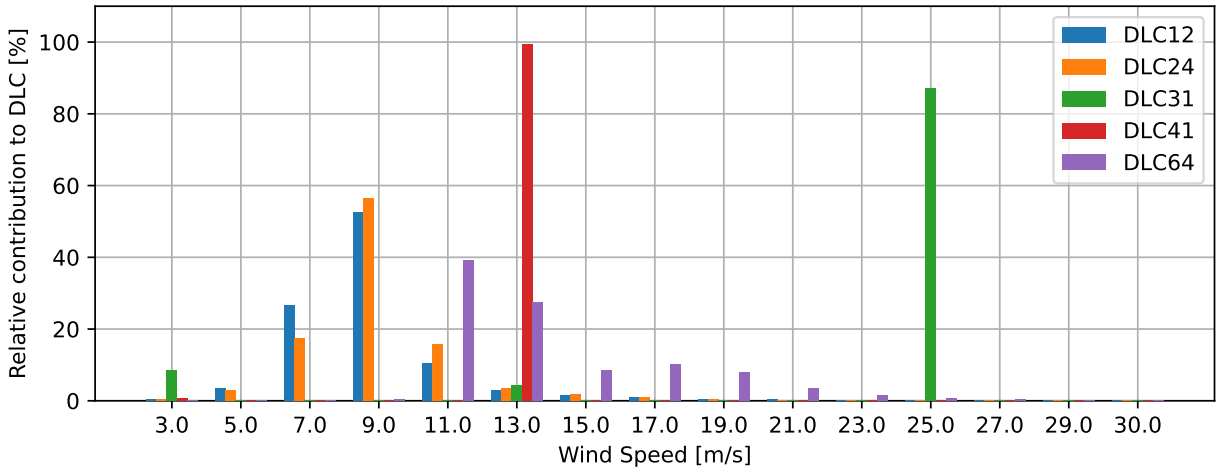

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

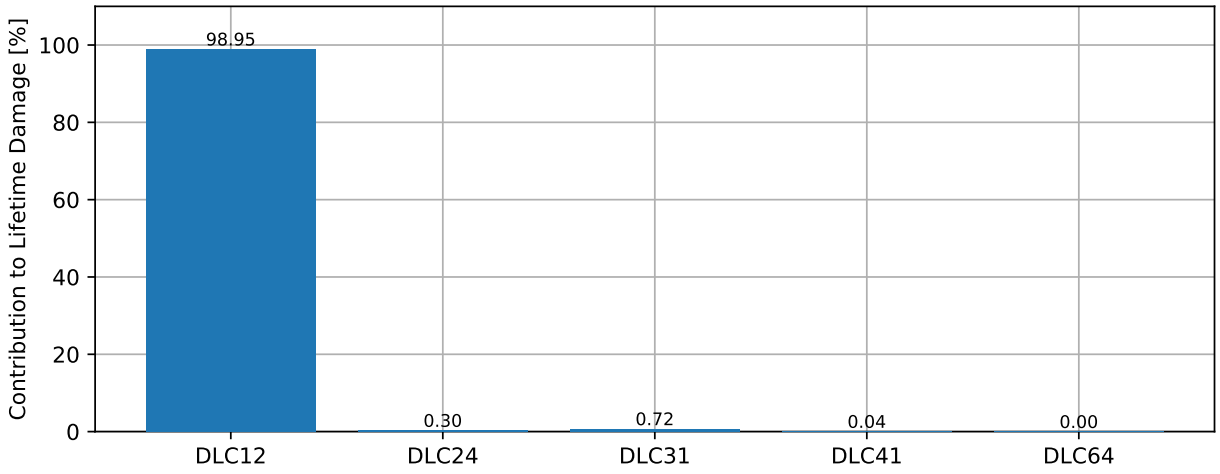
RootFzc3_[kN]

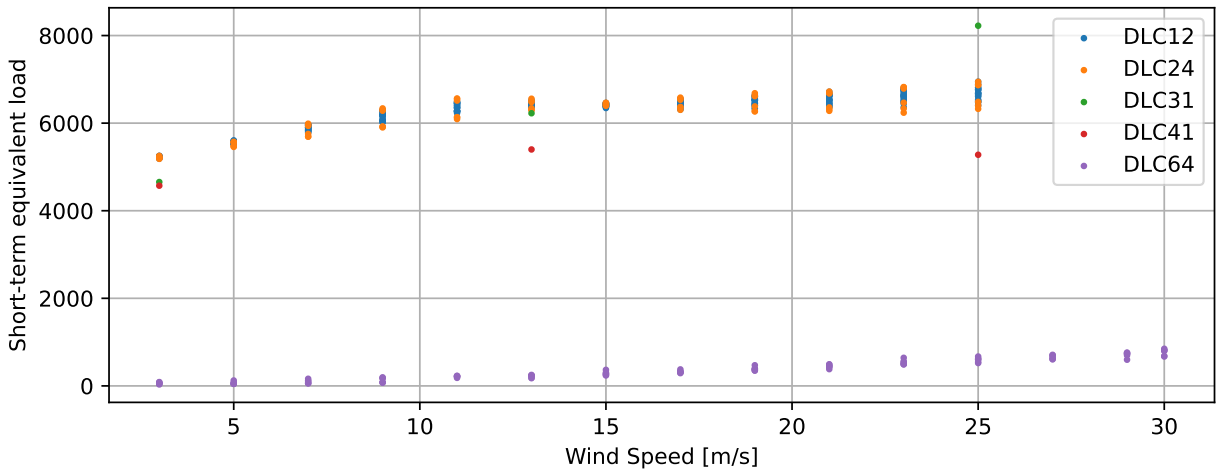

Contribution to Lifetime Damage [%]
97.97
0.32
0.27
1.44
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

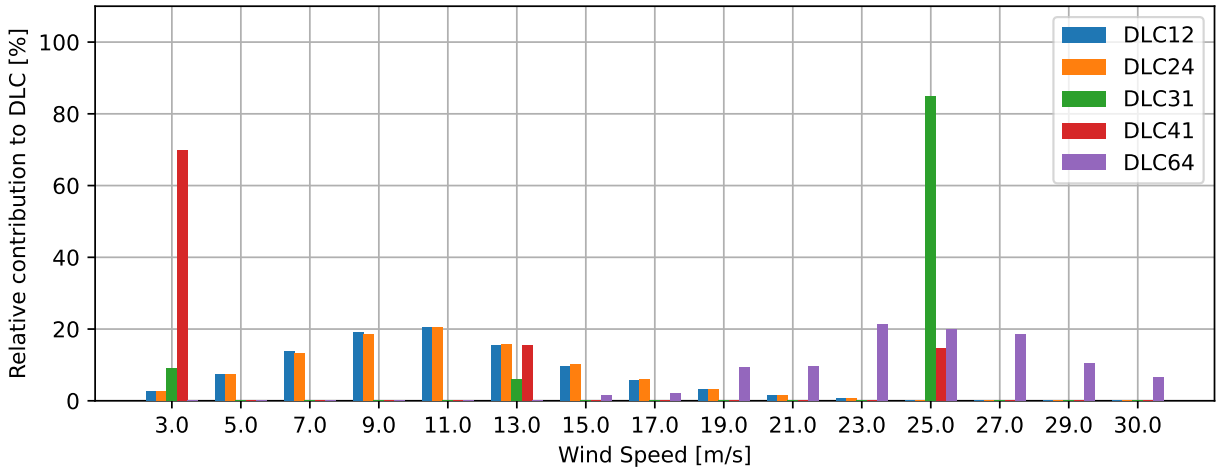

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

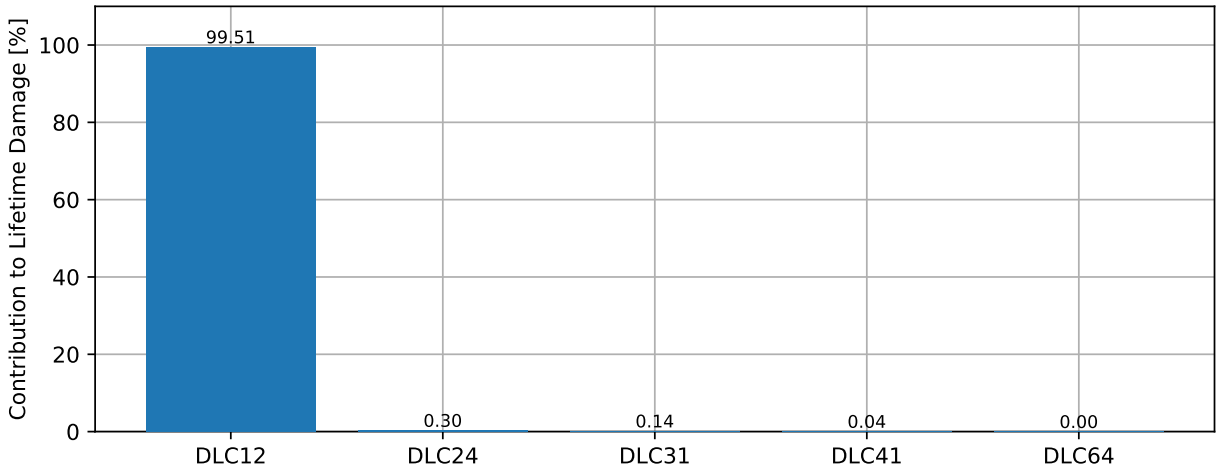
RootMxb1_[kN-m]

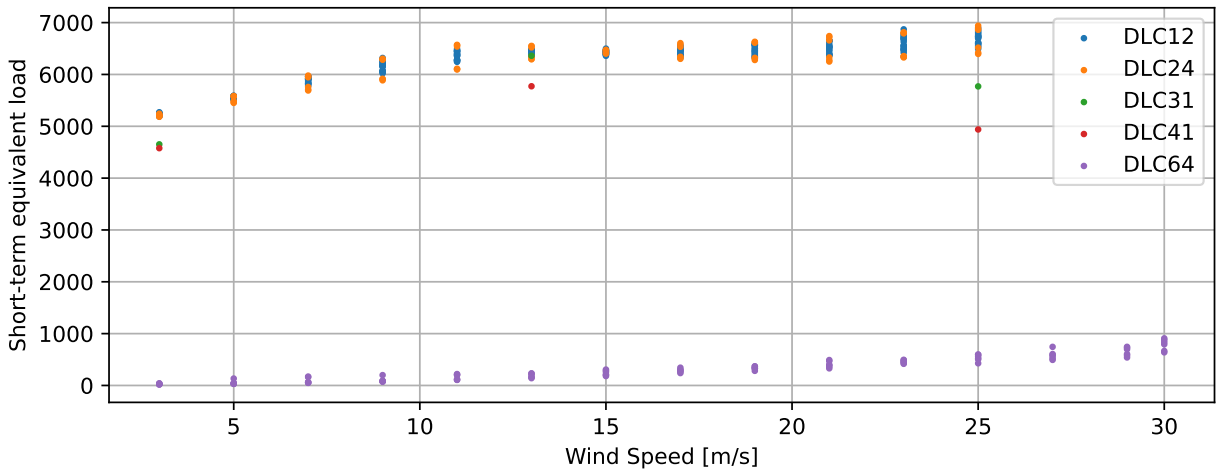


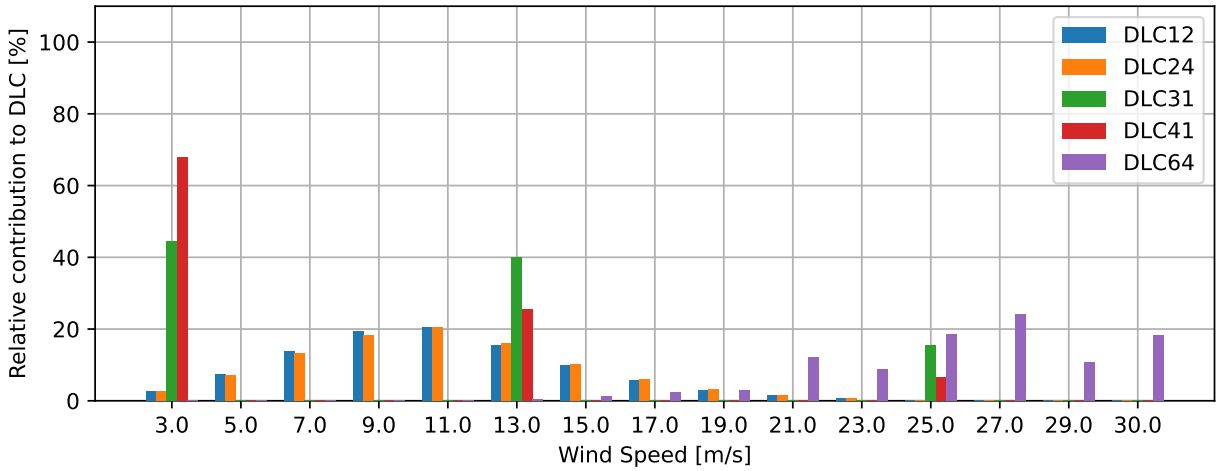




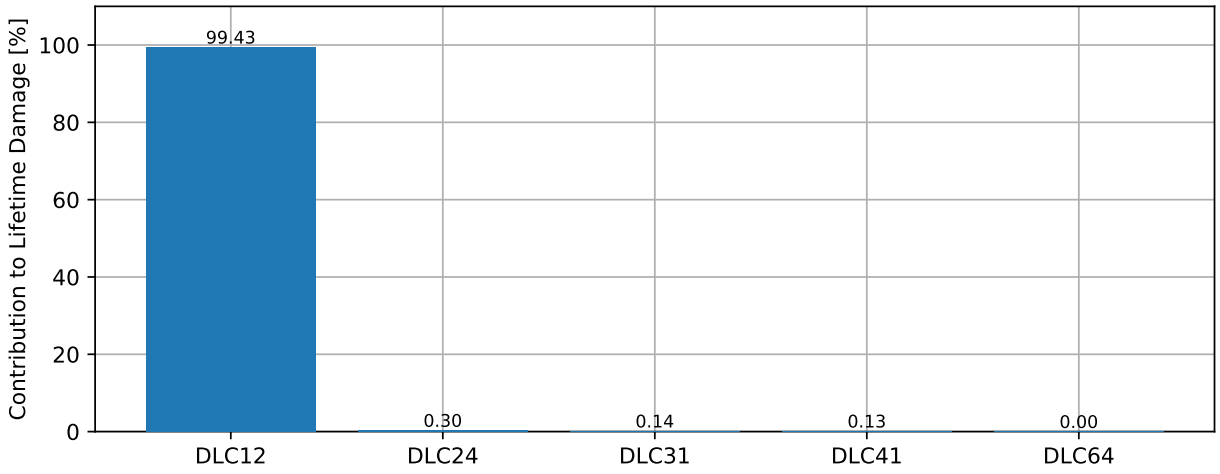
RootMxb2_ [kN-m]

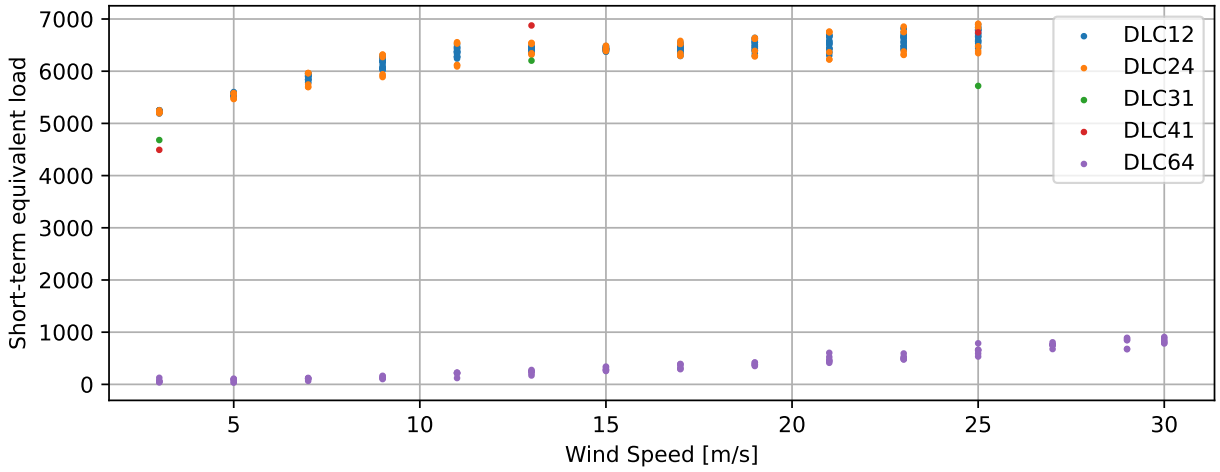


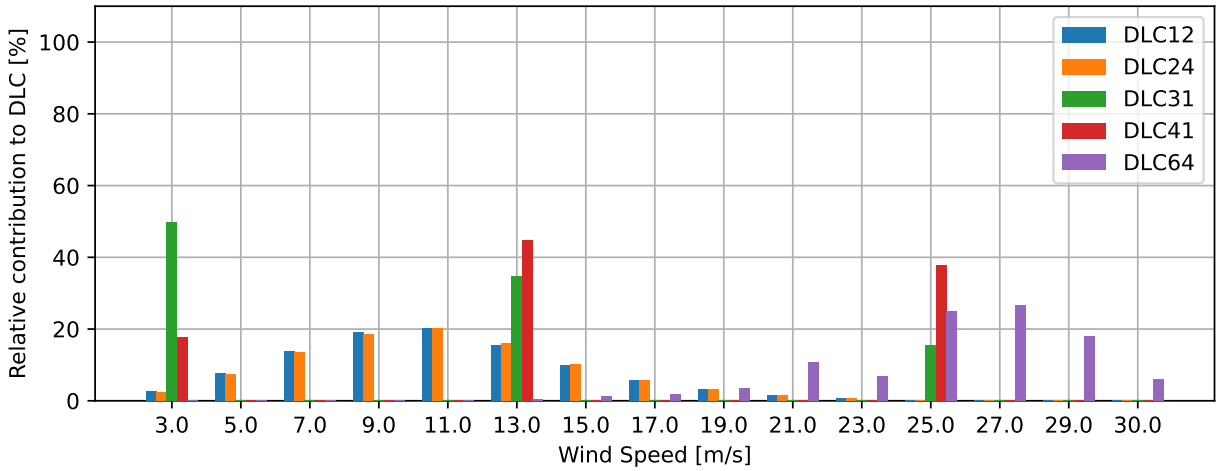




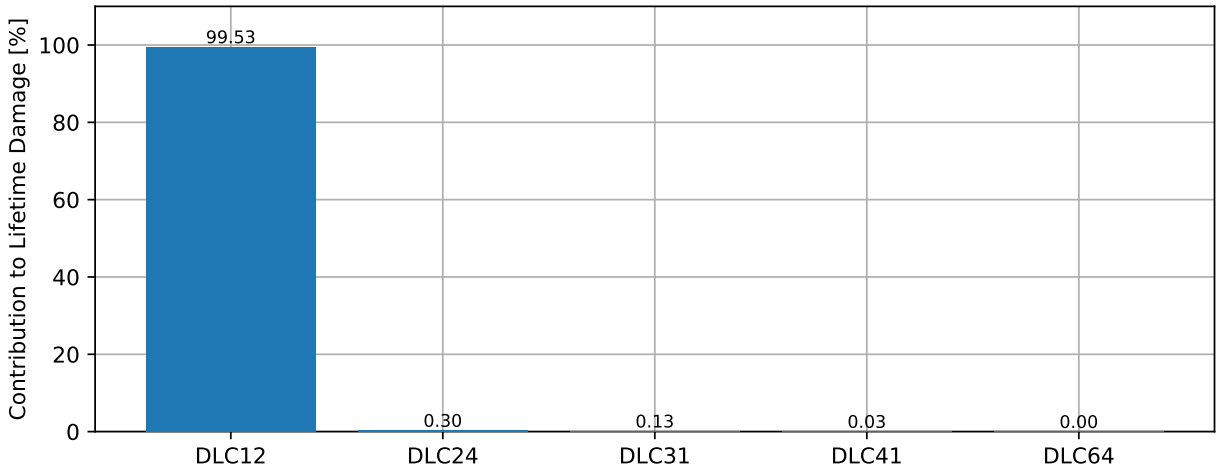
RootMxb3_[kN-m]

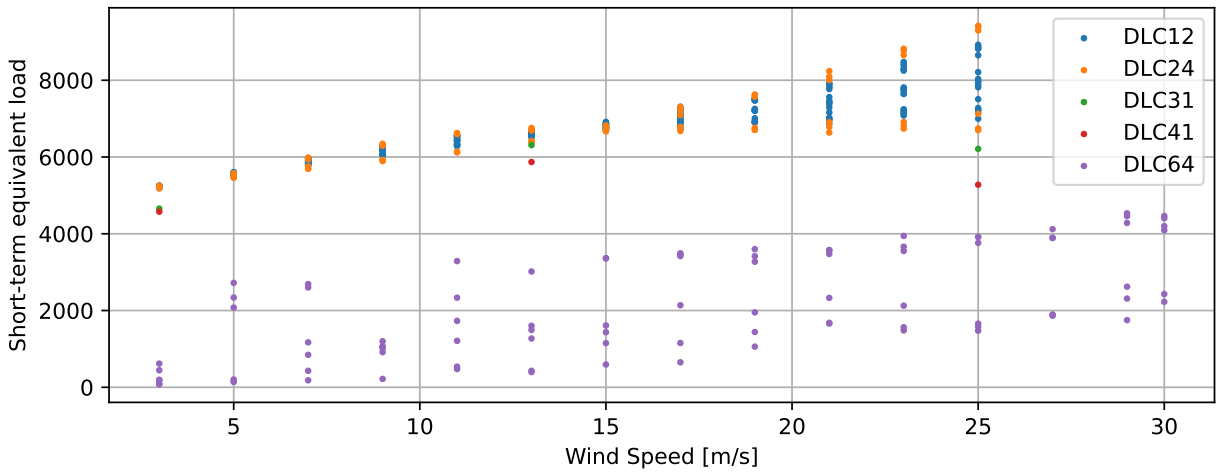


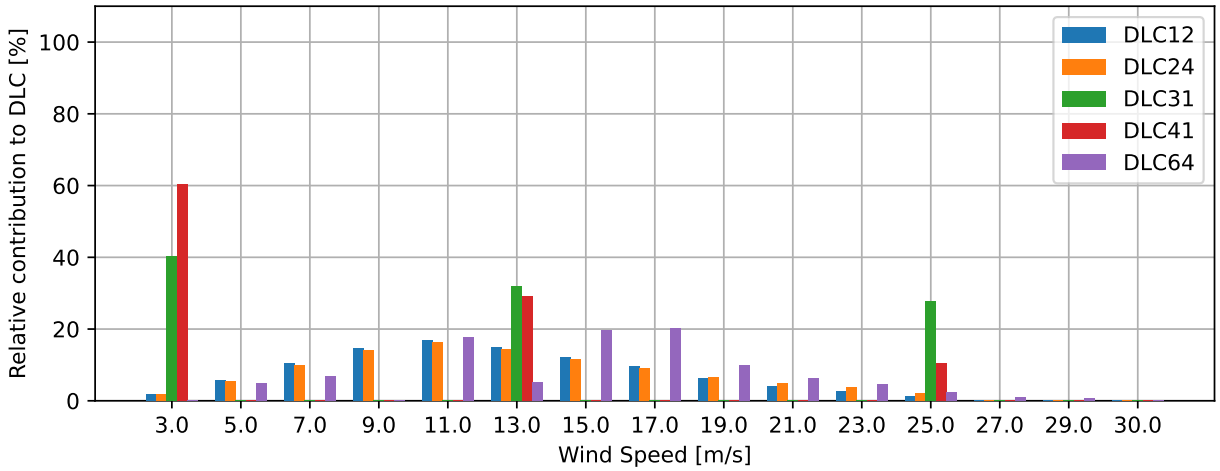




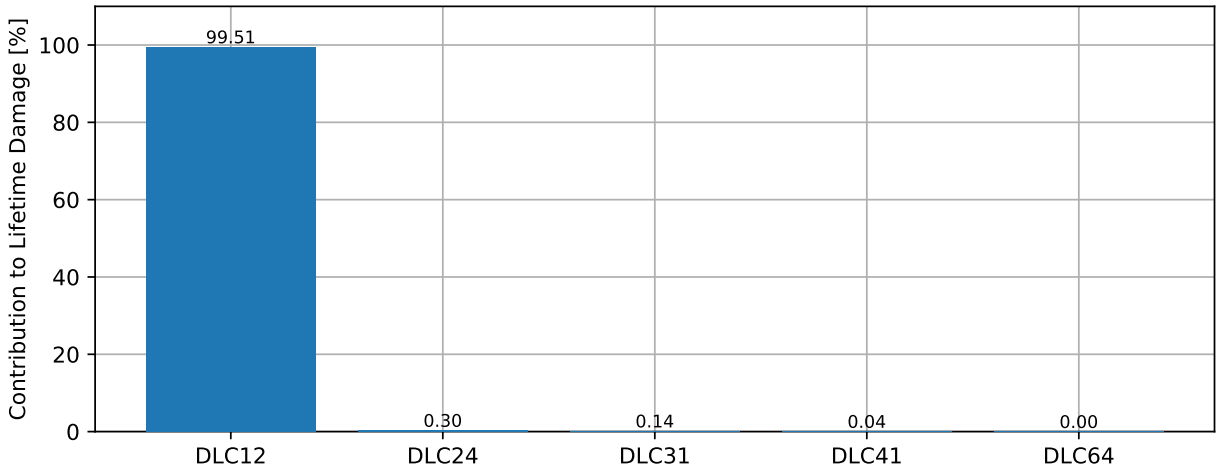
RootMxc1_[kN-m]

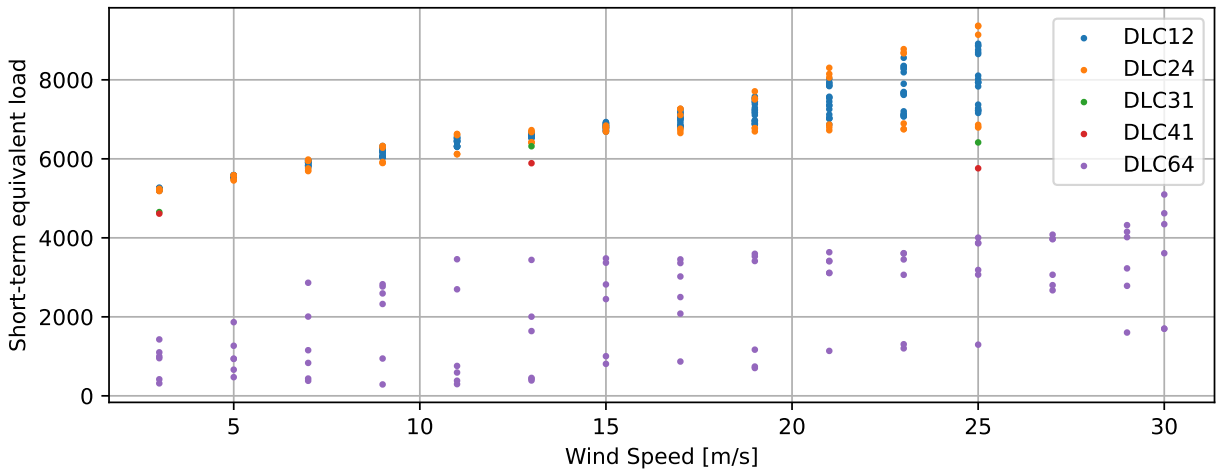


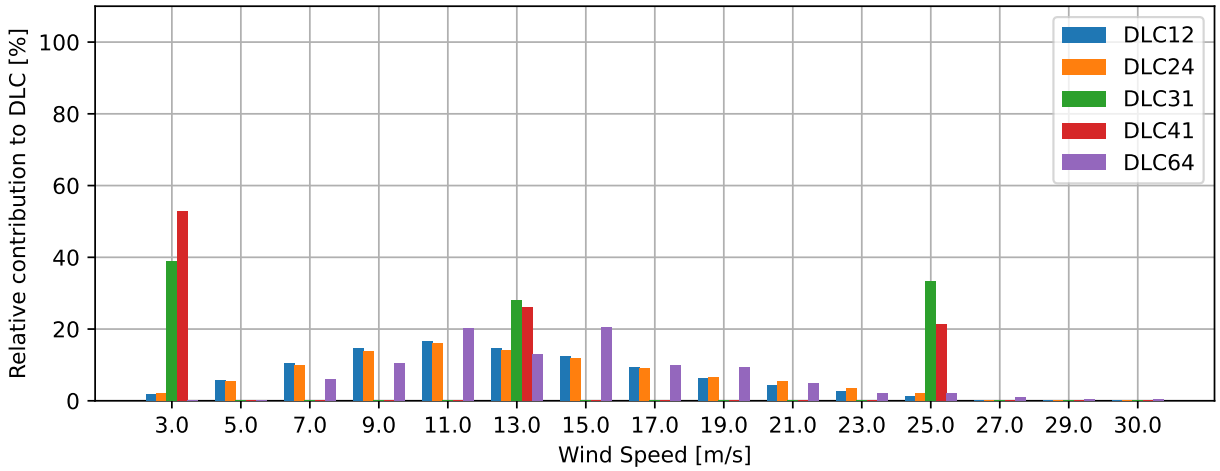




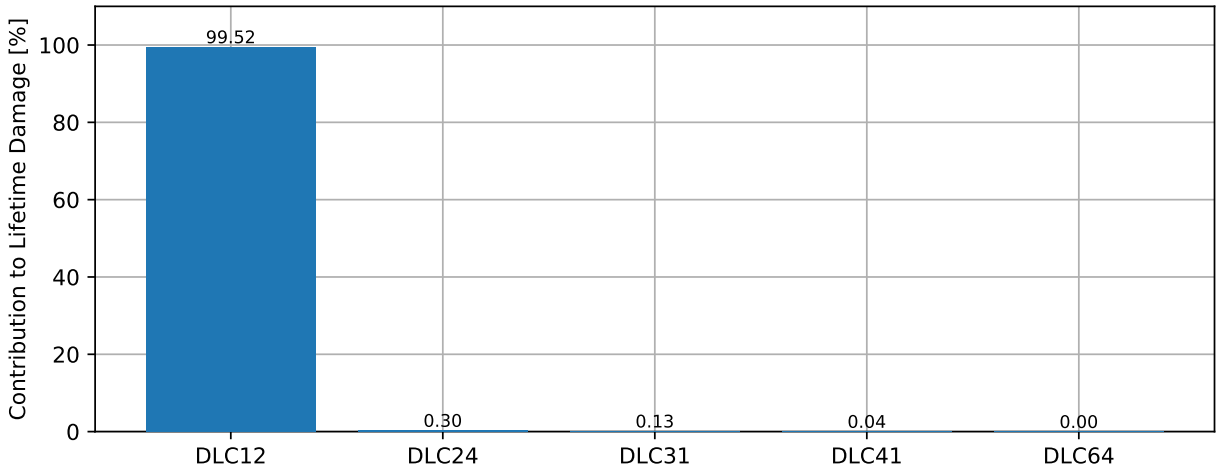
RootMxc2_[kN-m]

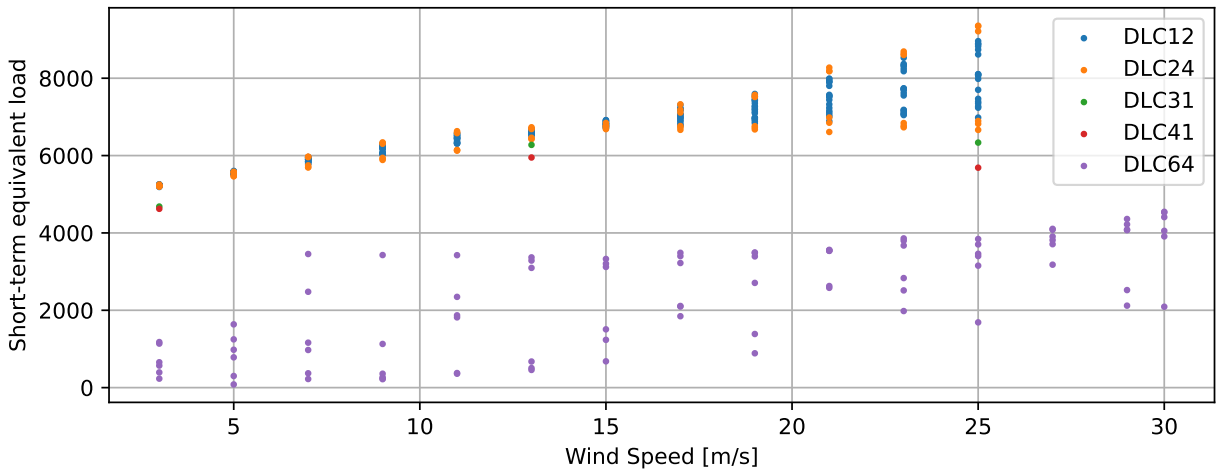


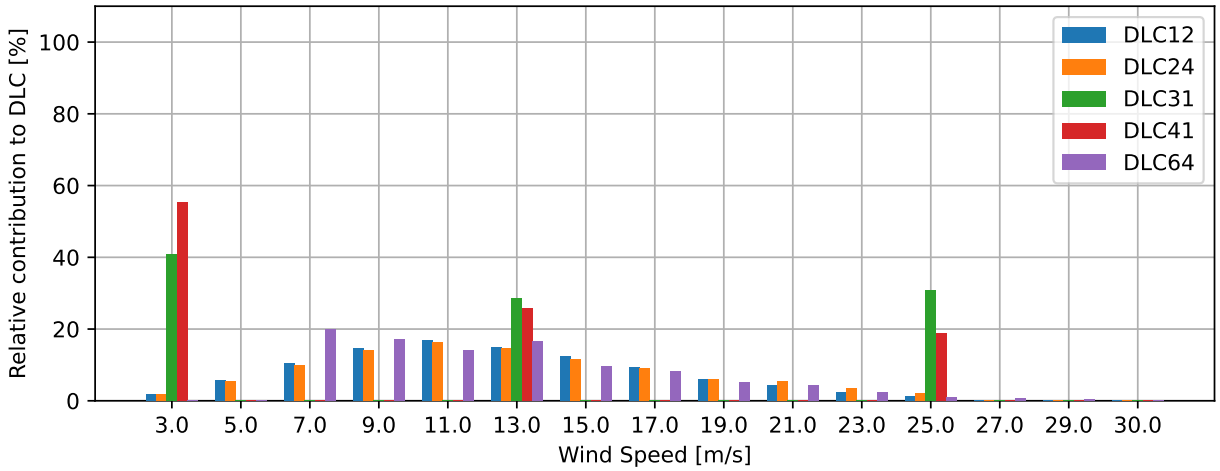




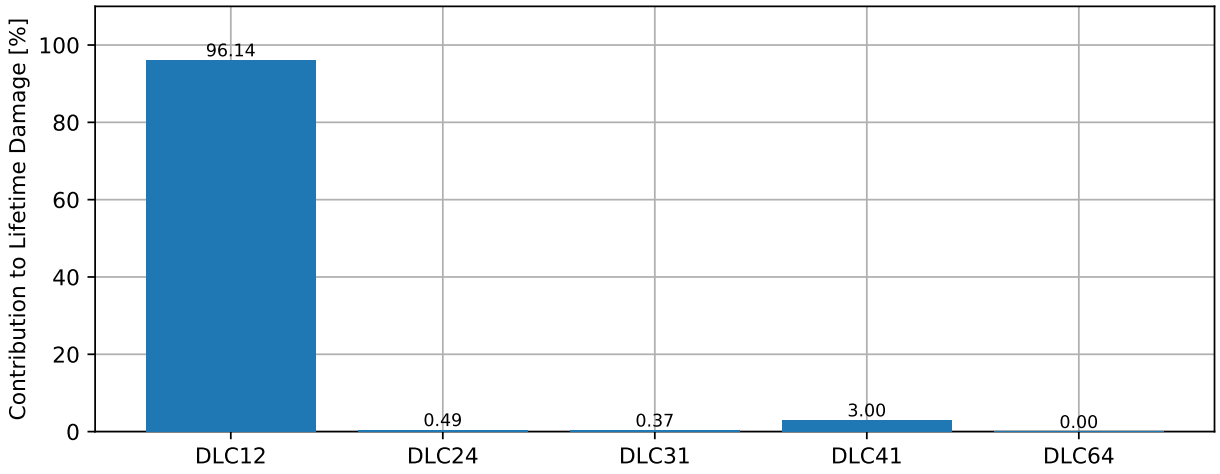
RootMxc3_[kN-m]

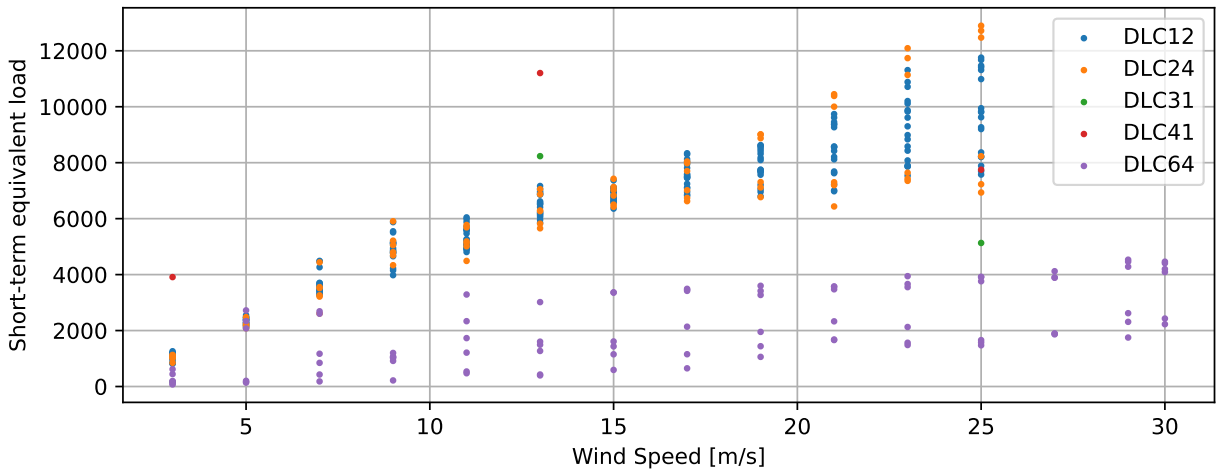


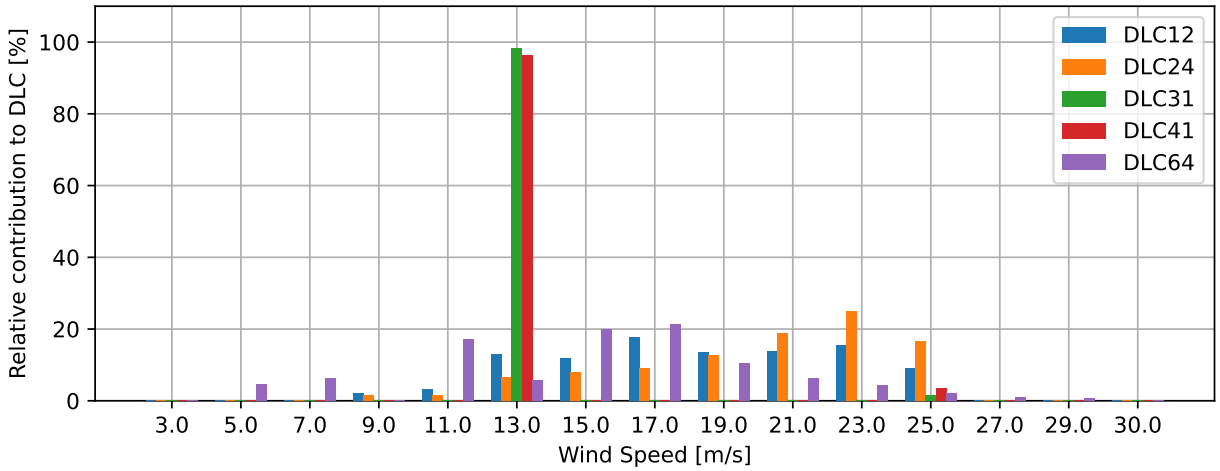




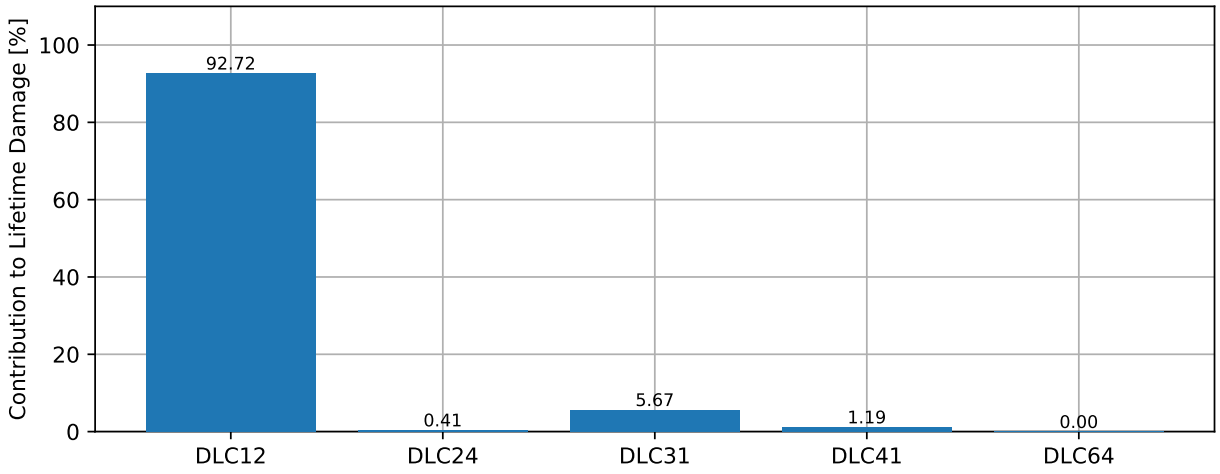
RootMyb1_[kN-m]

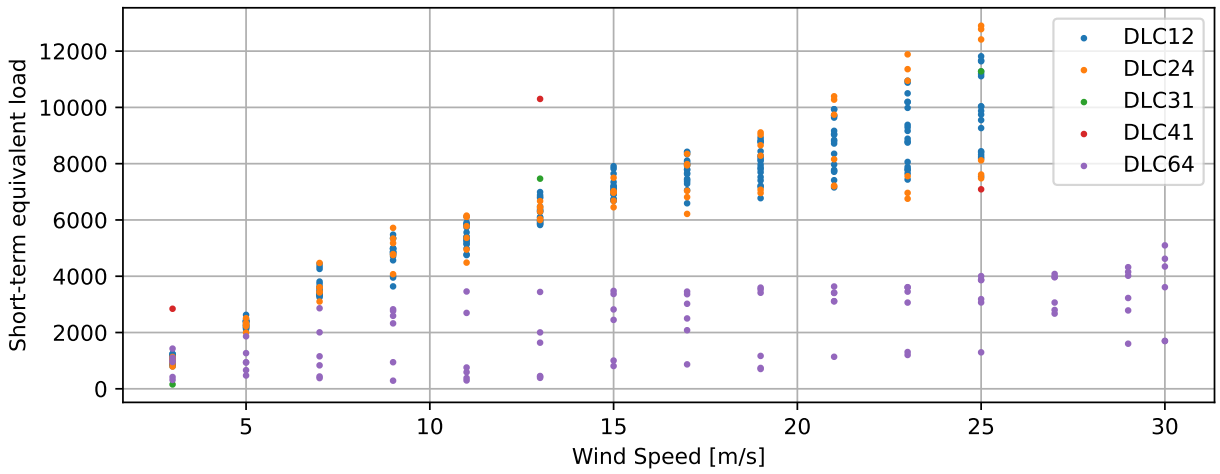


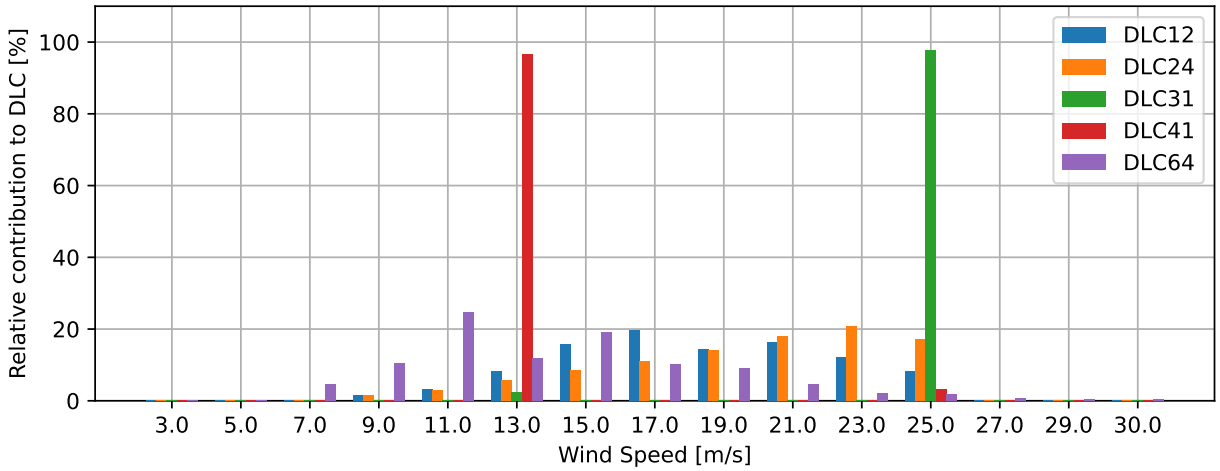




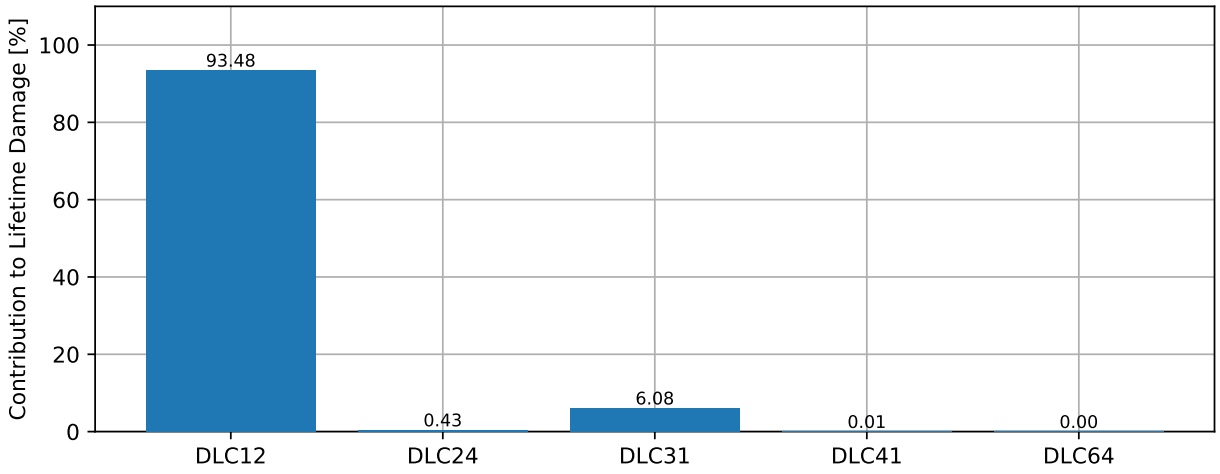
RootMyb2_[kN-m]

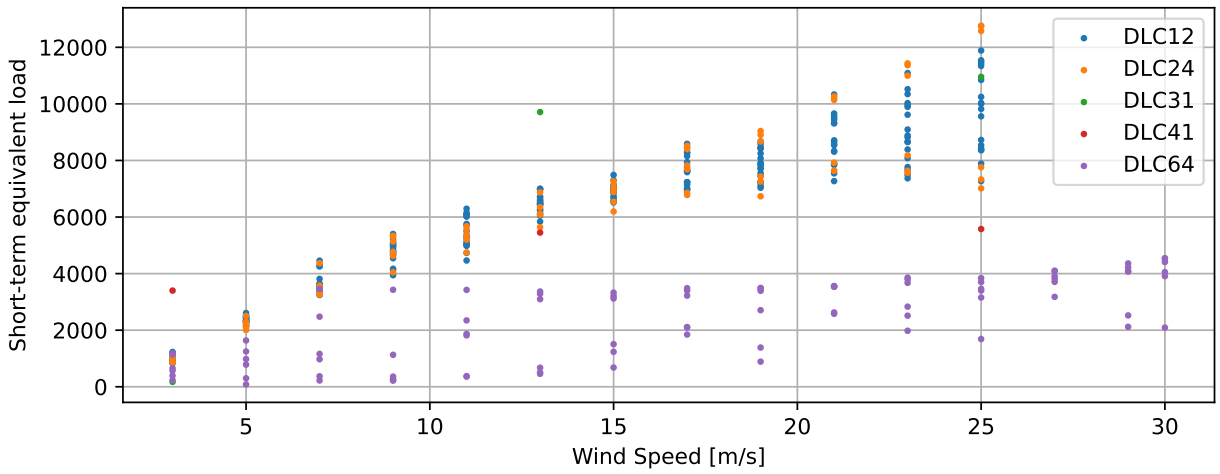


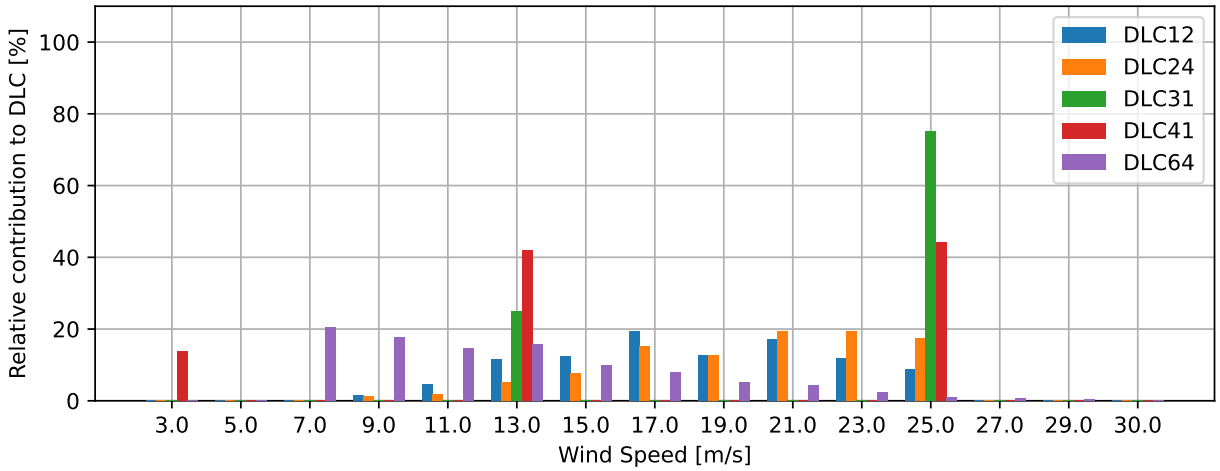




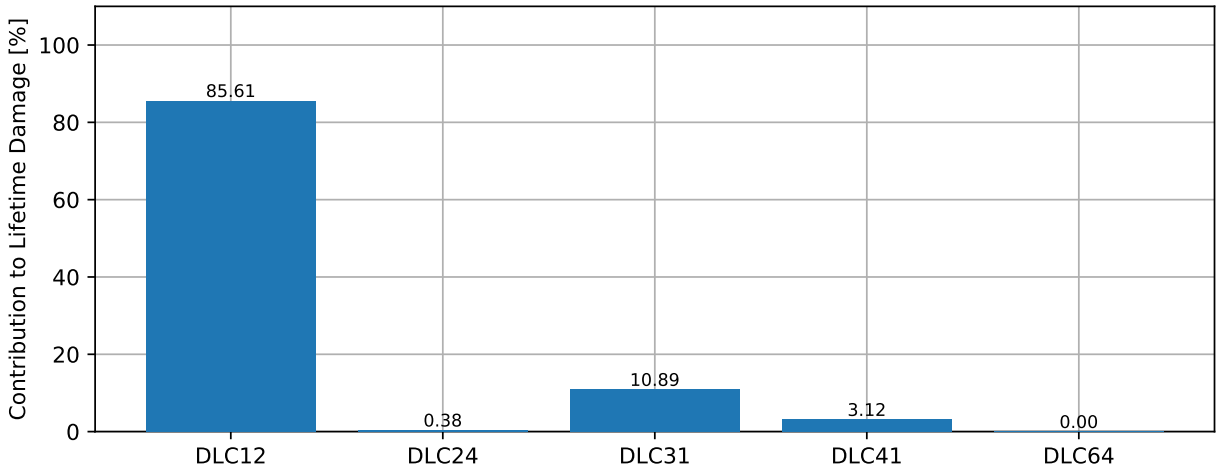
RootMyb3_[kN-m]

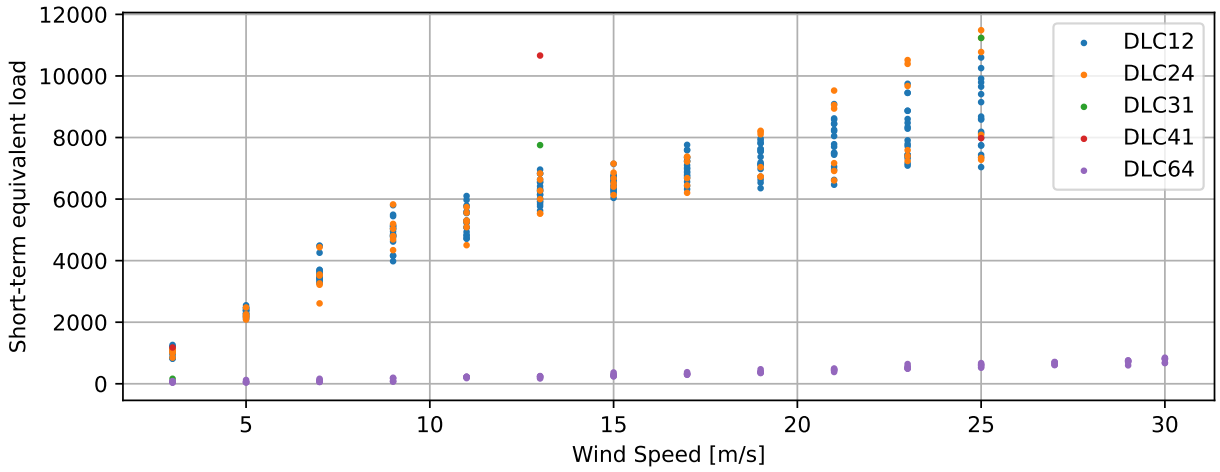


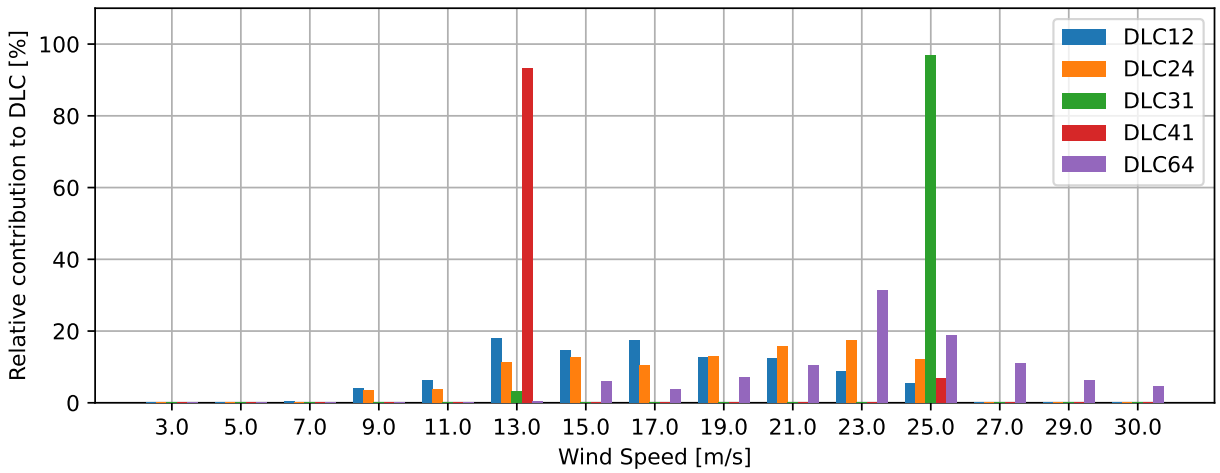




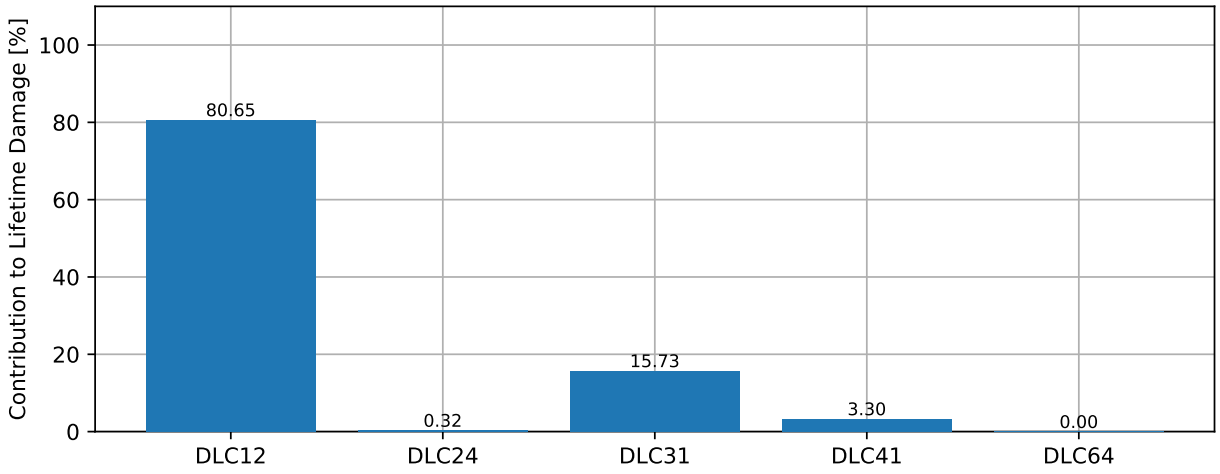
RootMyc1_[kN-m]

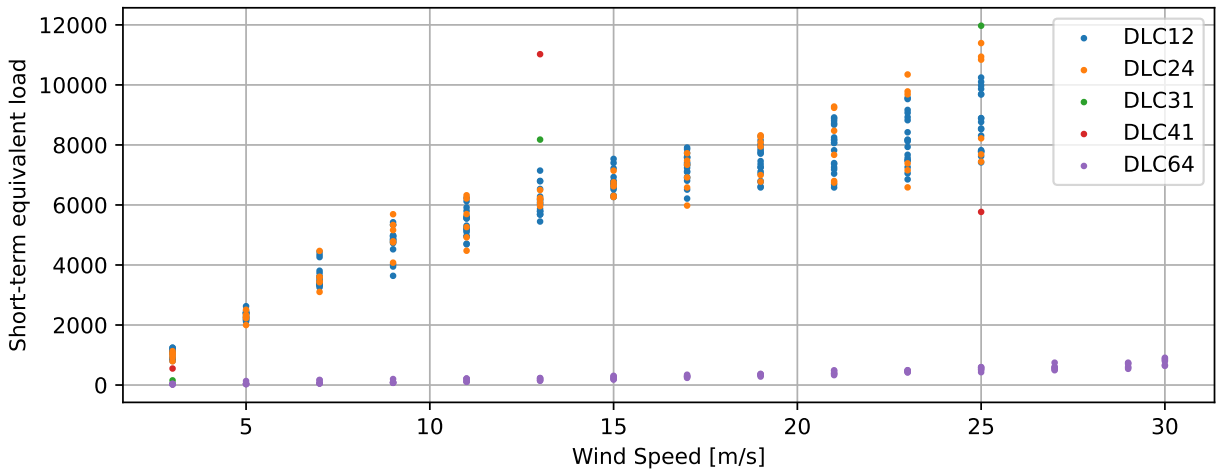


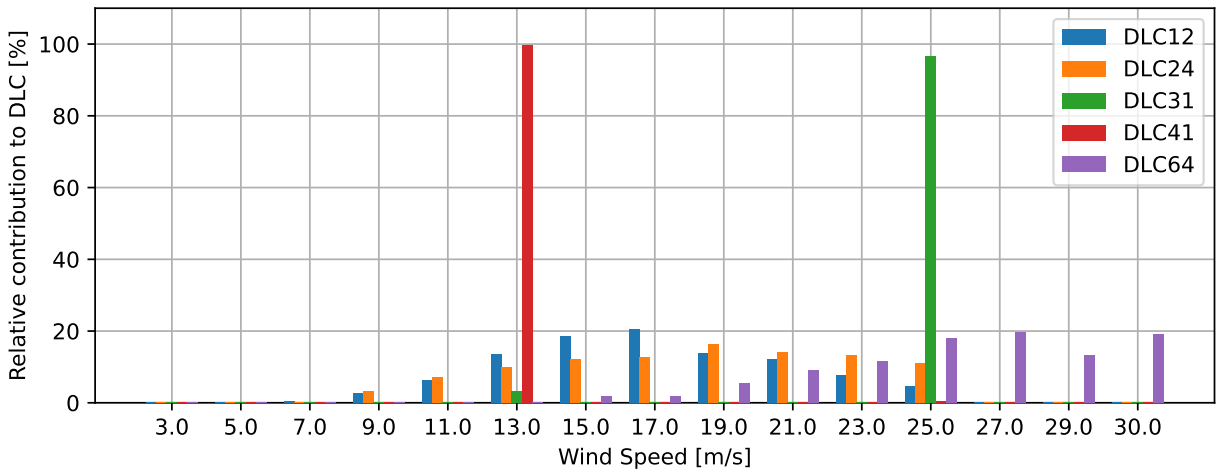




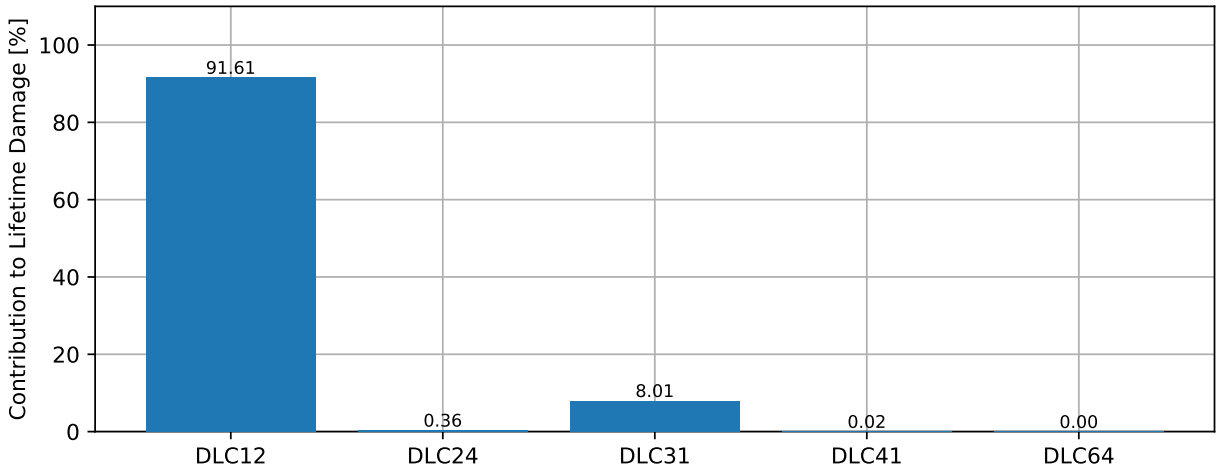
RootMyc2_[kN-m]

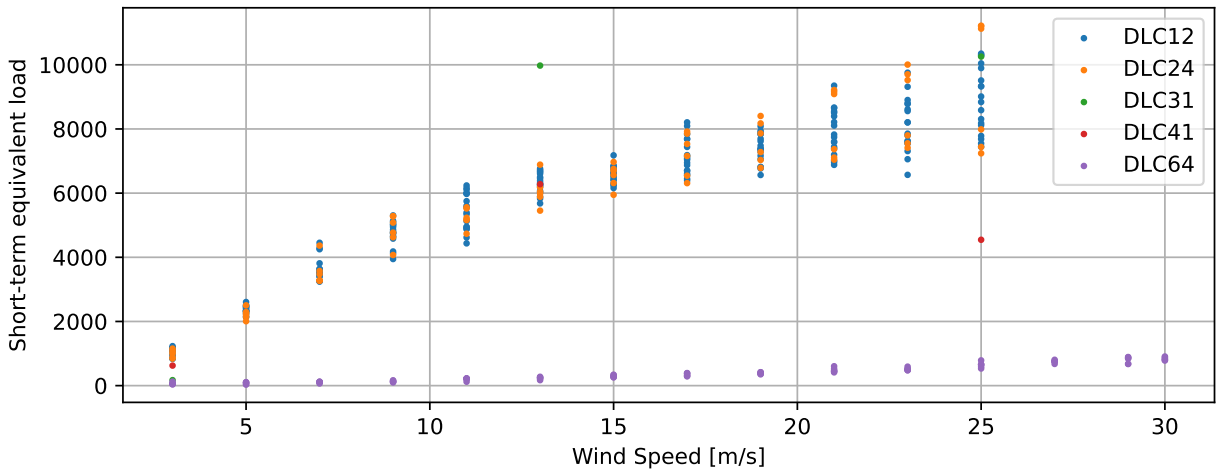


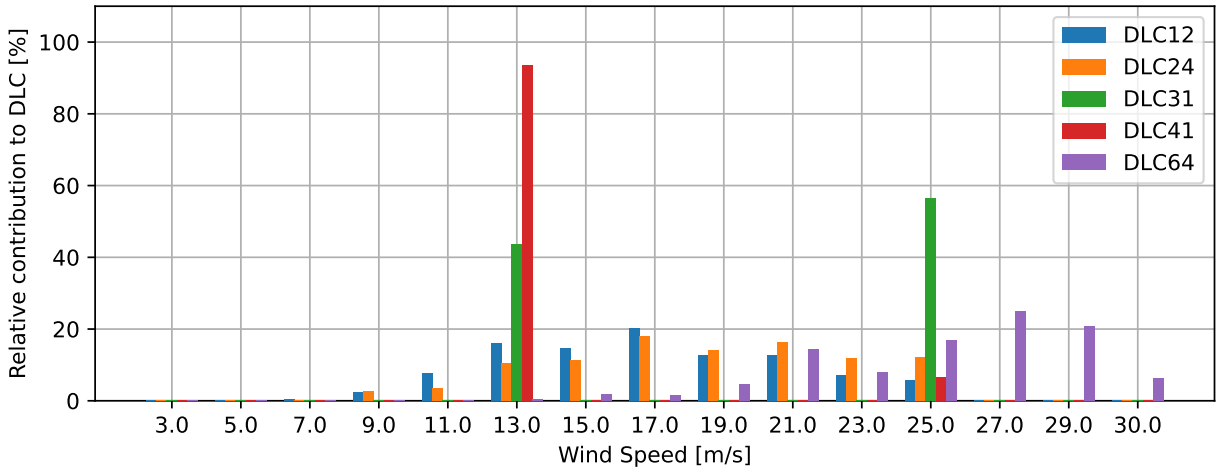




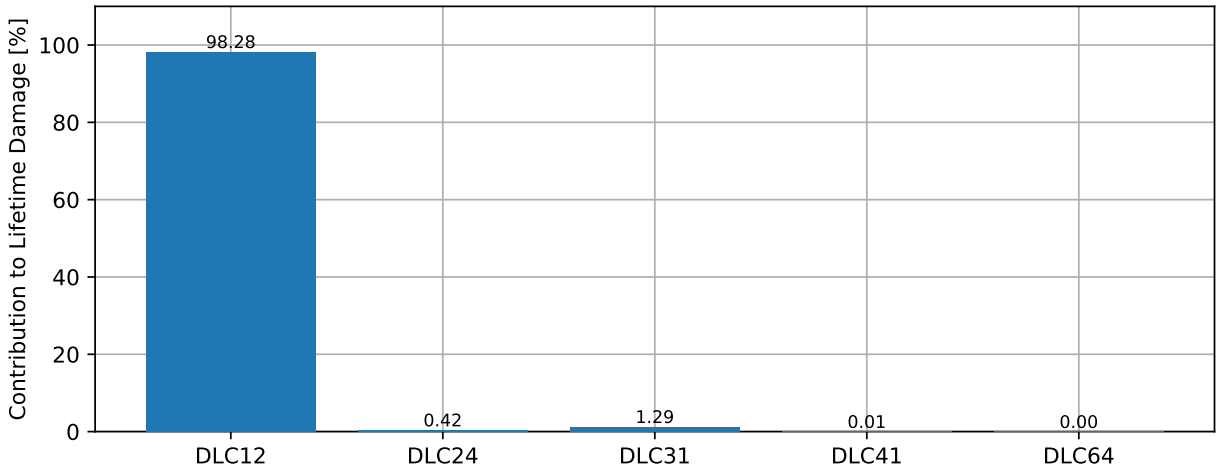
RootMyc3_[kN-m]

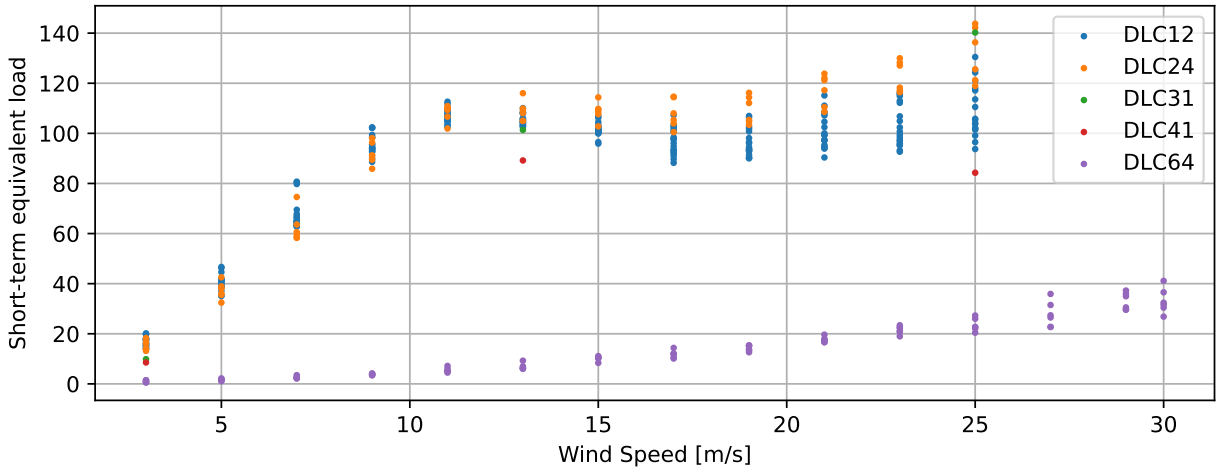


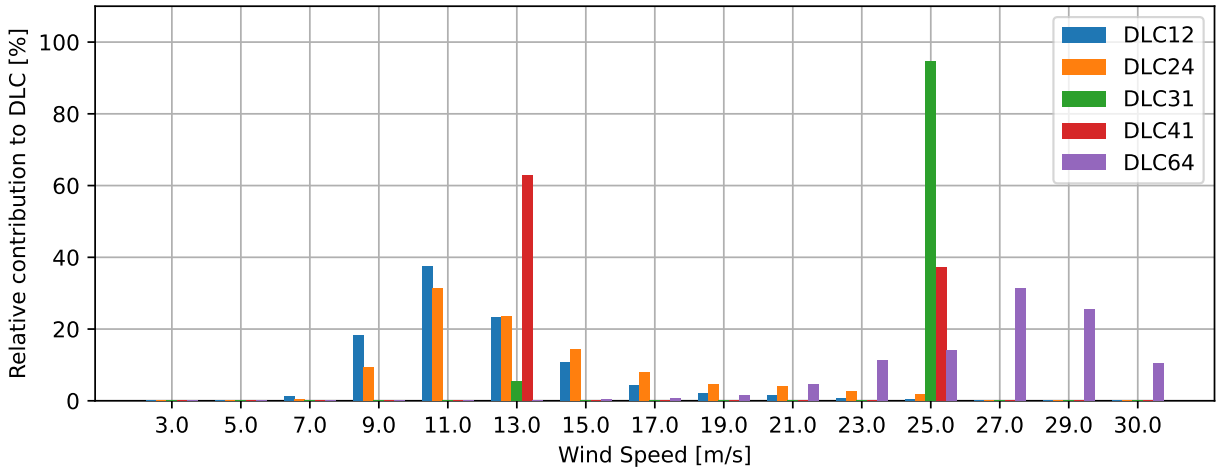




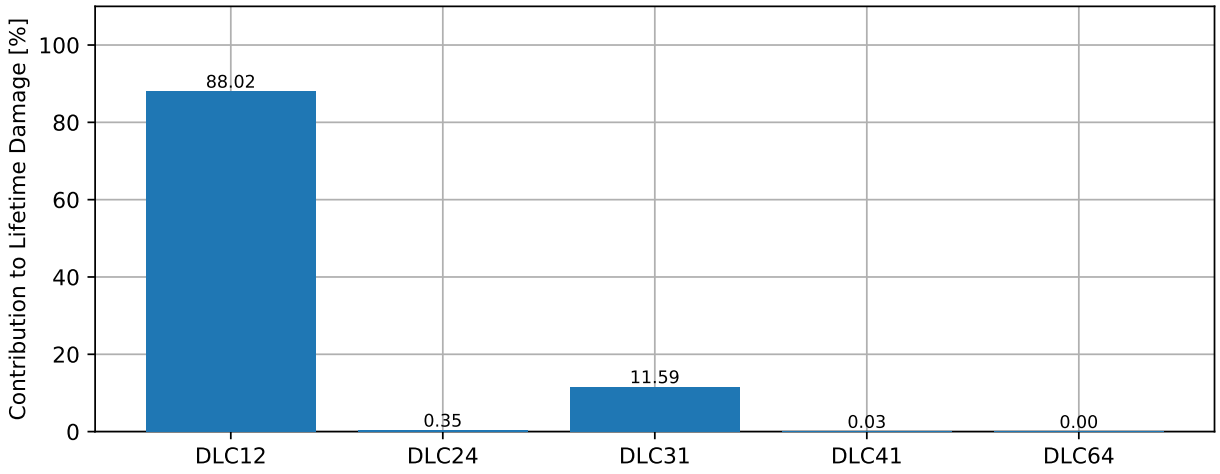
RootMzc1_[kN-m]

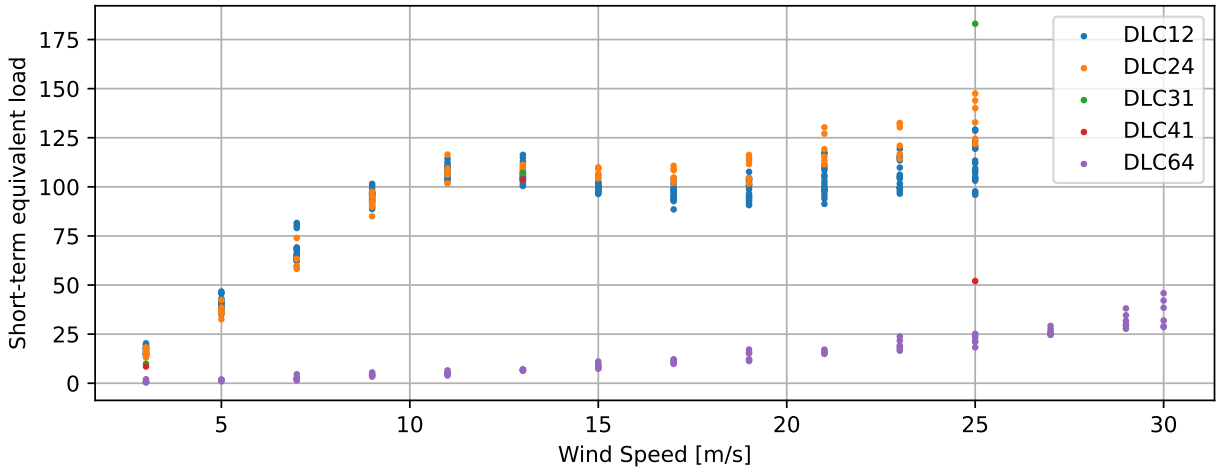


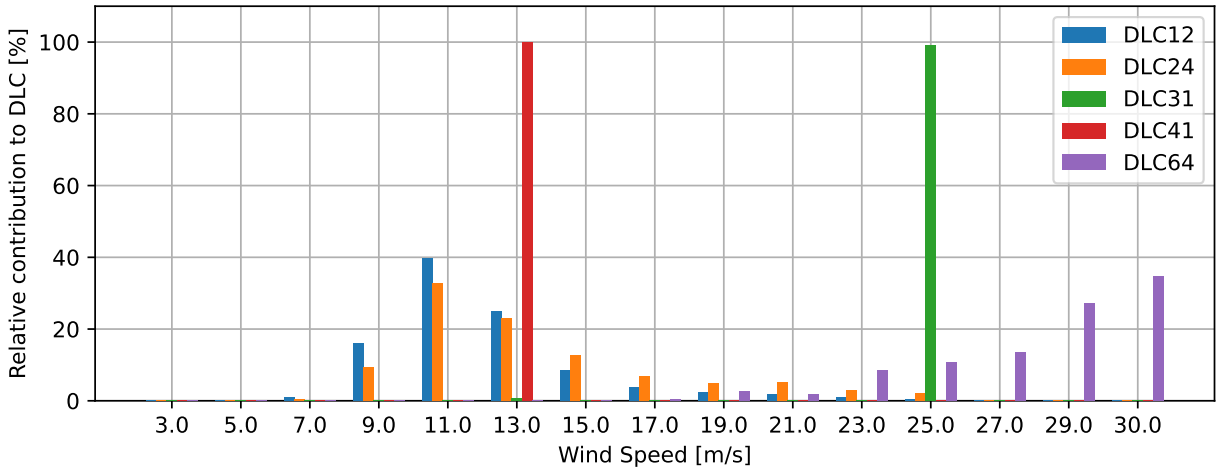




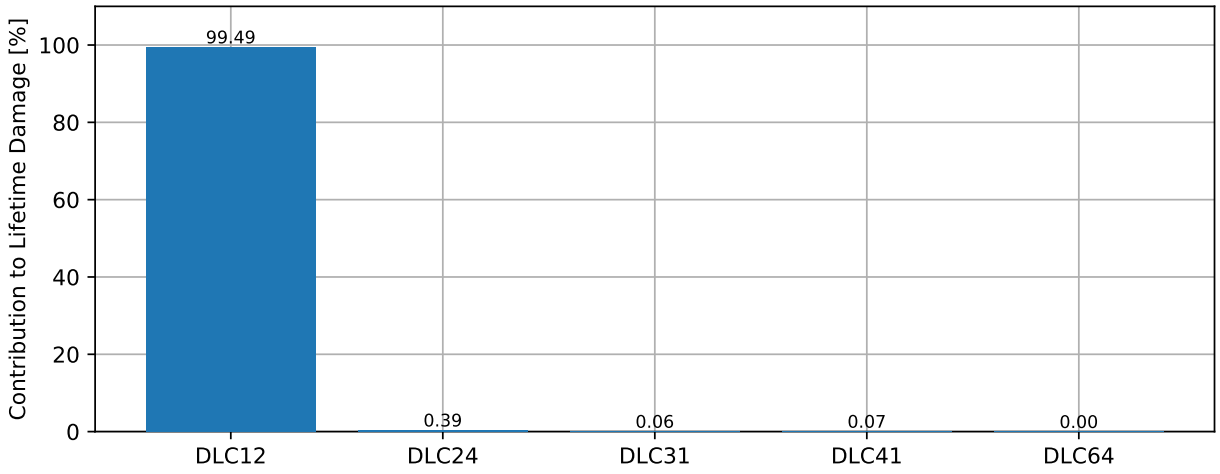
RootMzc2_[kN-m]

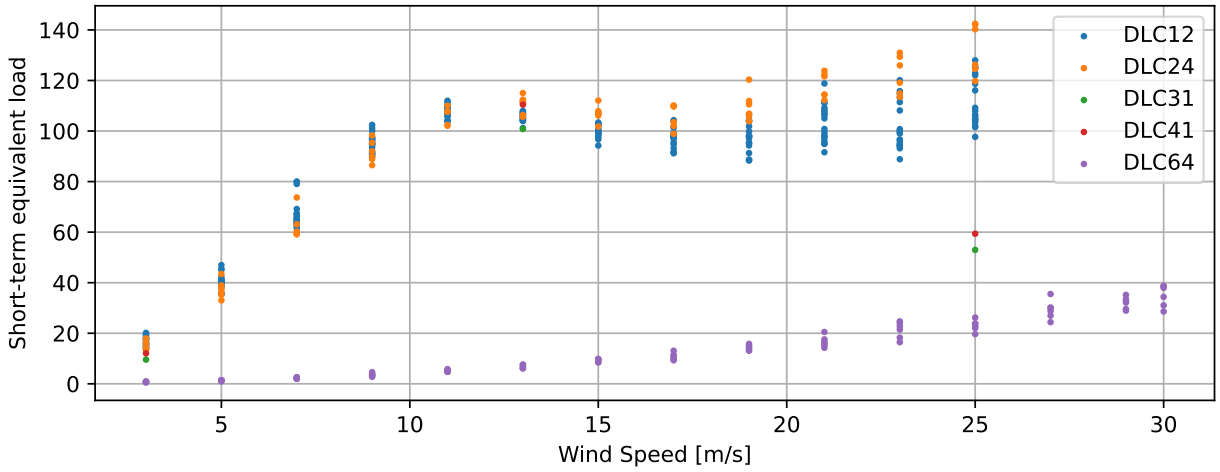


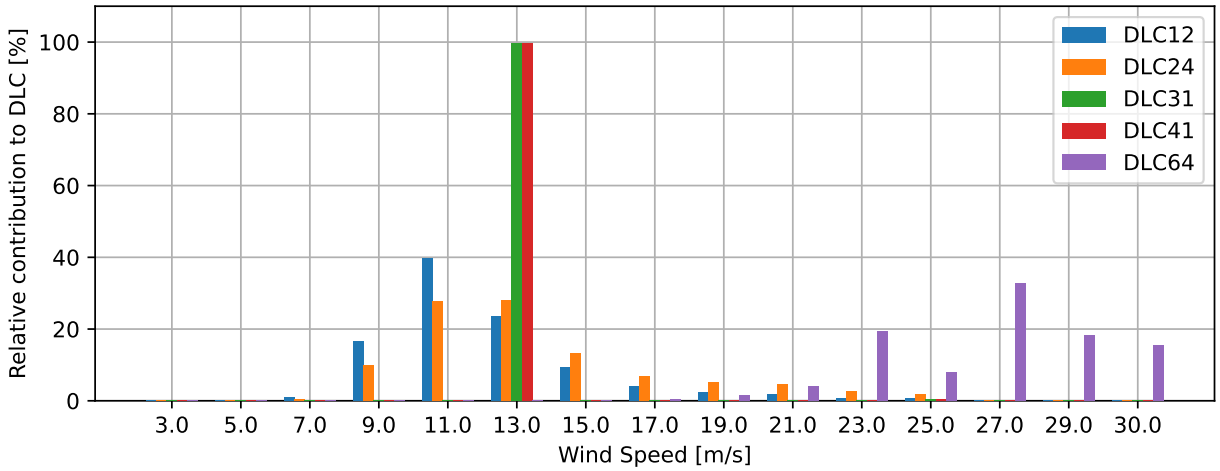




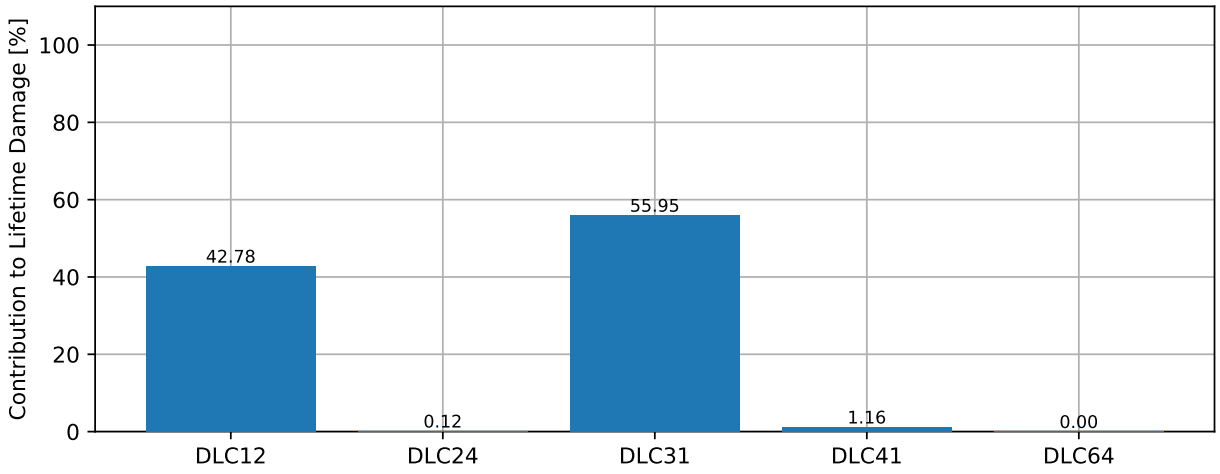
RootMzc3_[kN-m]

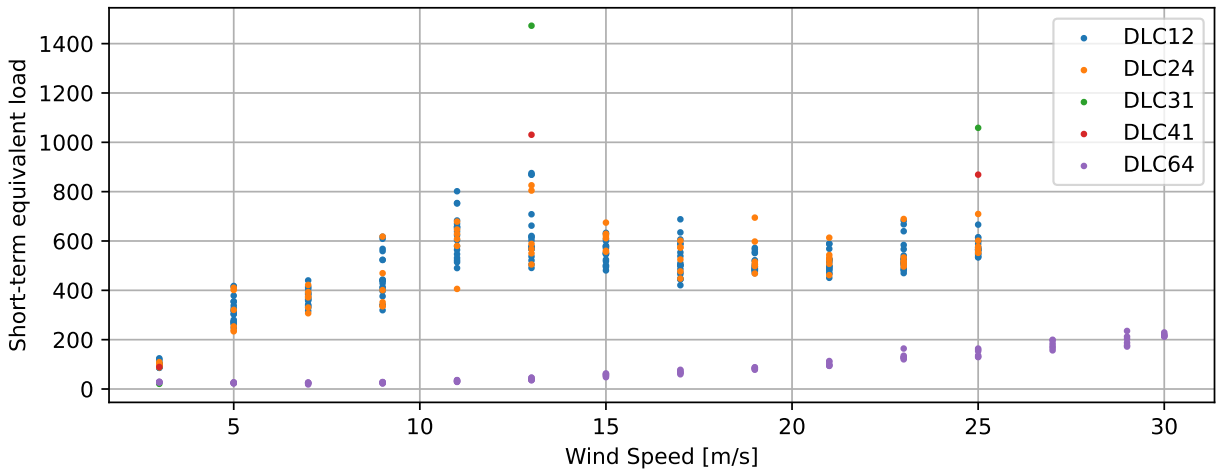


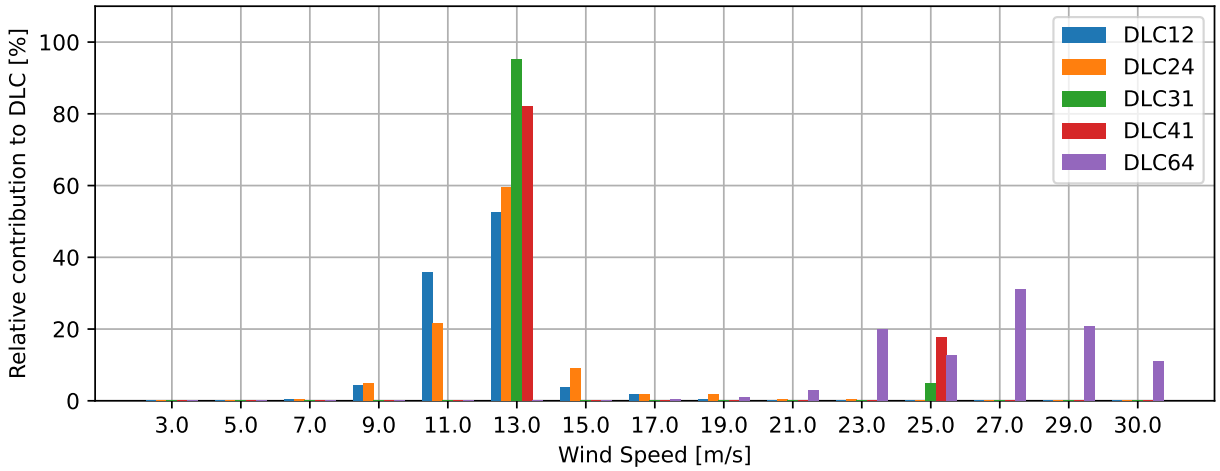




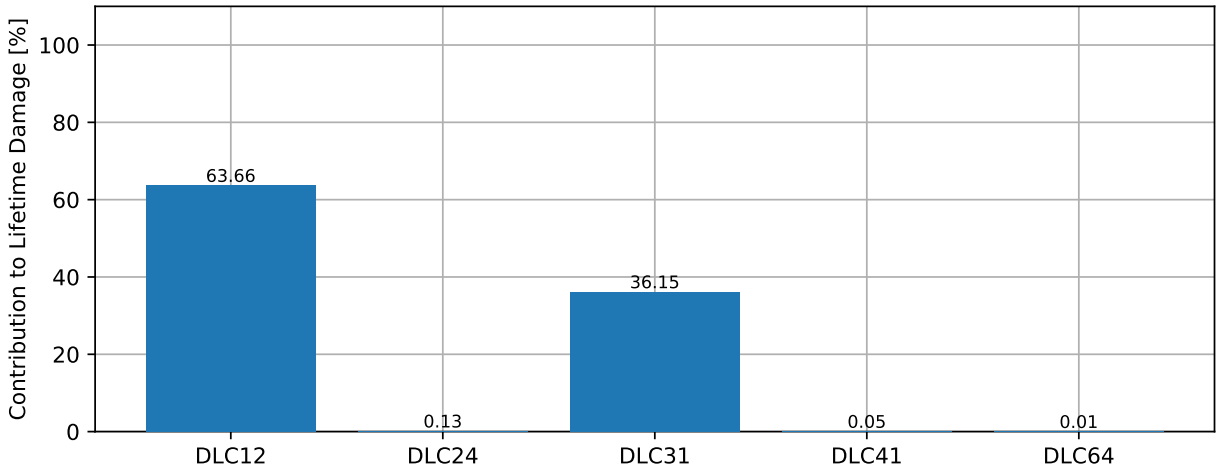
TwrBsFxt_[kN]

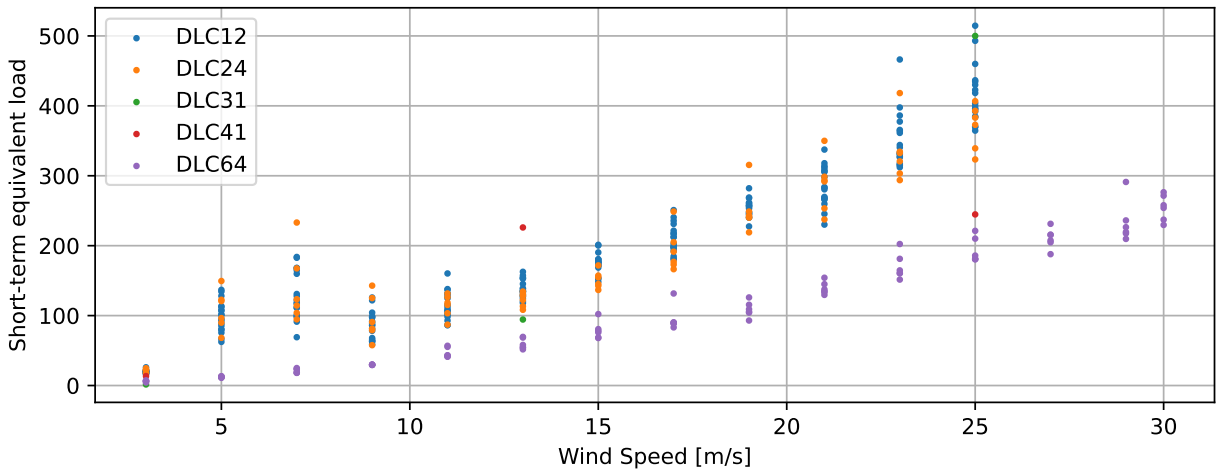

Contribution to Lifetime Damage [%]
0
20
40
60
80
100
42.78
0.12
55.95
1.16
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

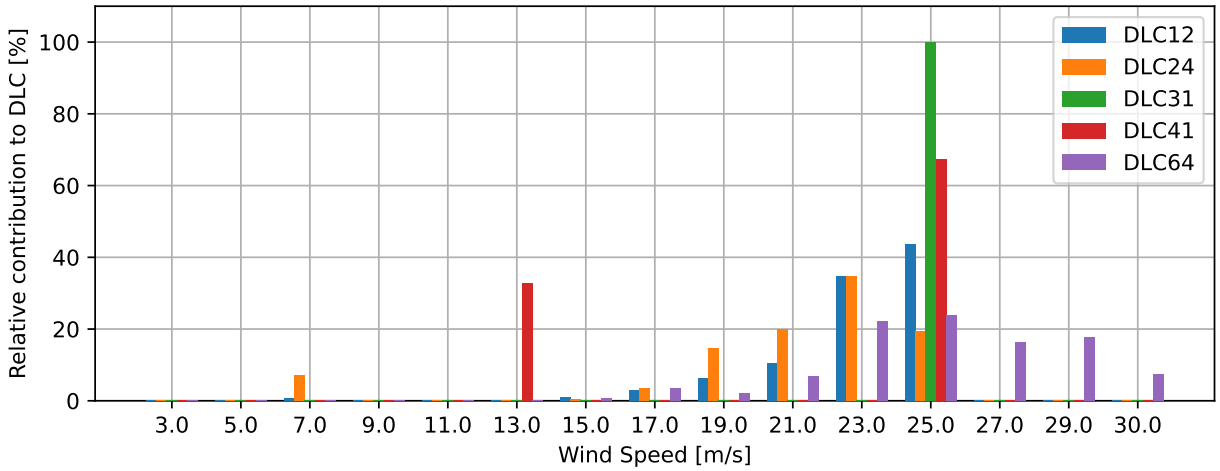

Short-term equivalent load
0
200
400
600
800
1000
1200
1400
5
10
15
20
25
30
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
0
20
40
60
80
100
3.0
5.0
7.0
9.0
11.0
13.0
15.0
17.0
19.0
21.0
23.0
25.0
27.0
29.0
30.0
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

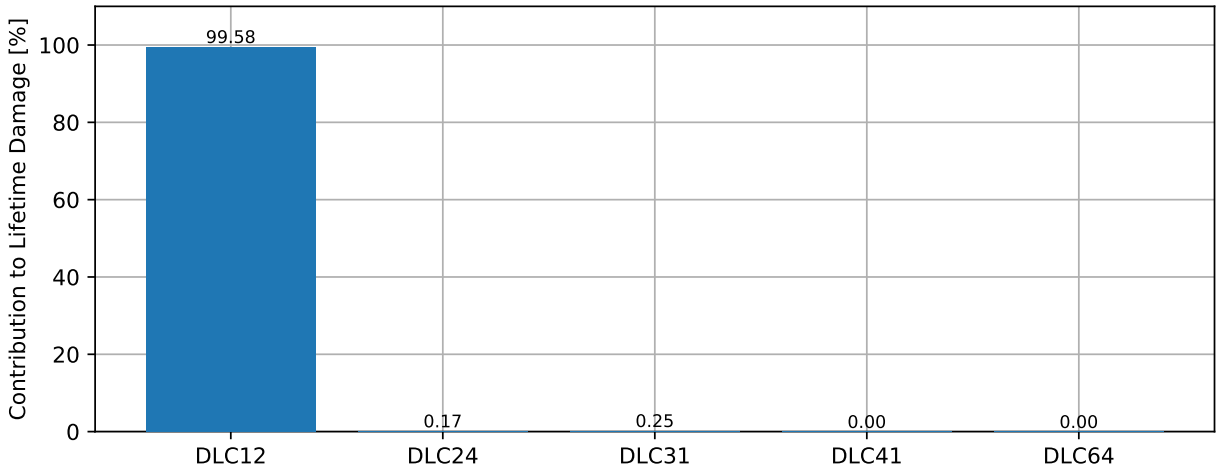
TwrBsFyt_[kN]

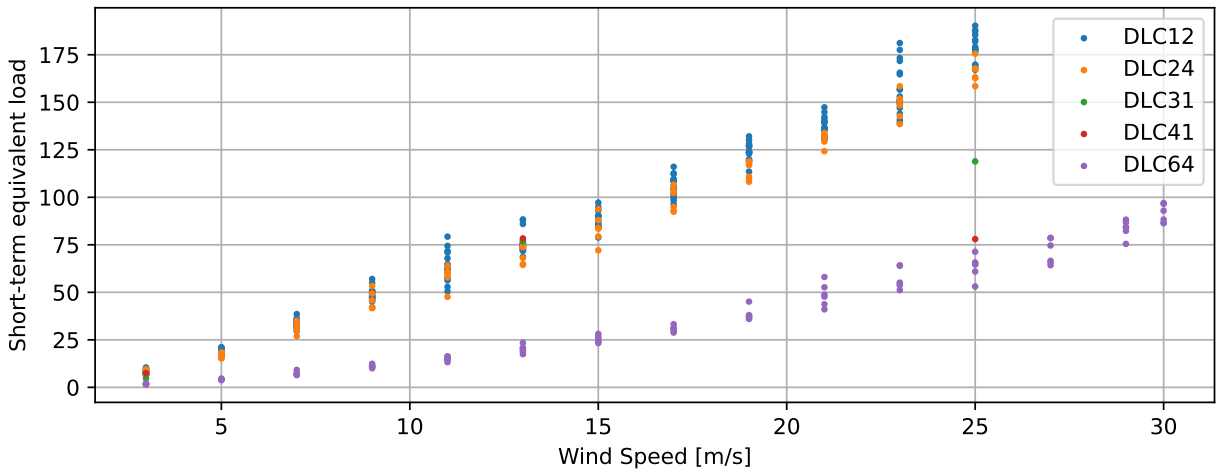

Contribution to Lifetime Damage [%]
0
20
40
60
80
100
63.66
0.13
36.15
0.05
0.01
DLC12
DLC24
DLC31
DLC41
DLC64

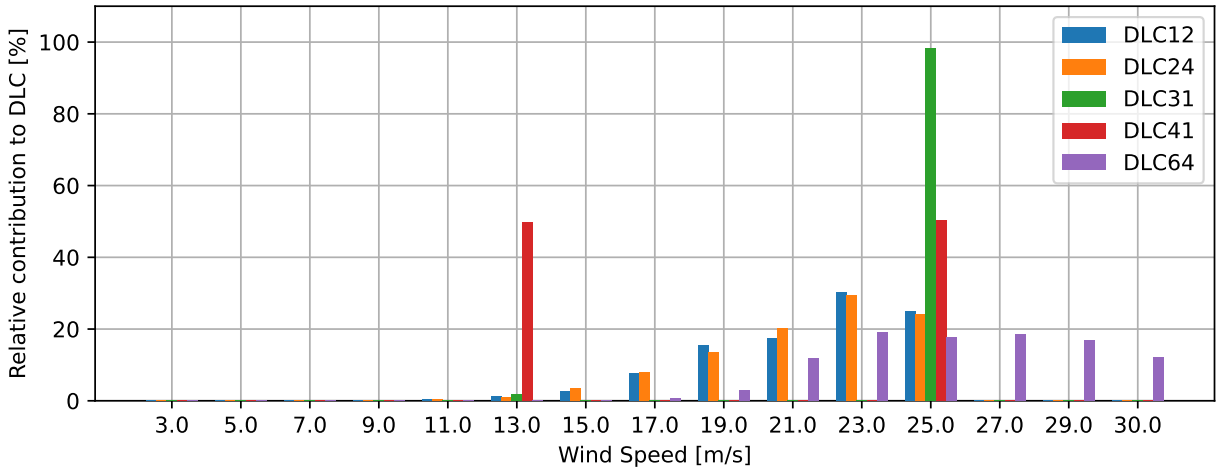

Short-term equivalent load
0
100
200
300
400
500
5
10
15
20
25
30
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
0
20
40
60
80
100
3.0
5.0
7.0
9.0
11.0
13.0
15.0
17.0
19.0
21.0
23.0
25.0
27.0
29.0
30.0
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

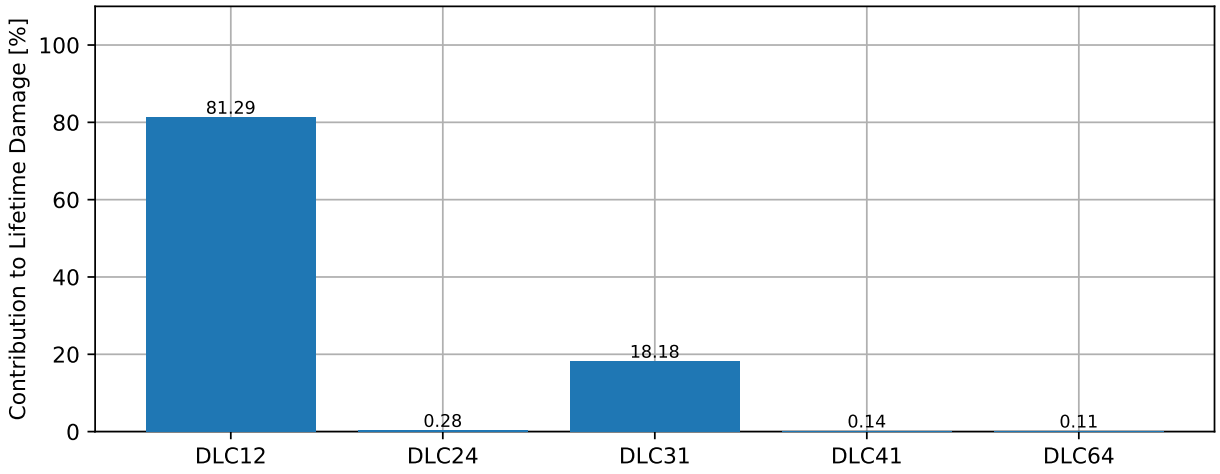
TwrBsFzt_[kN]

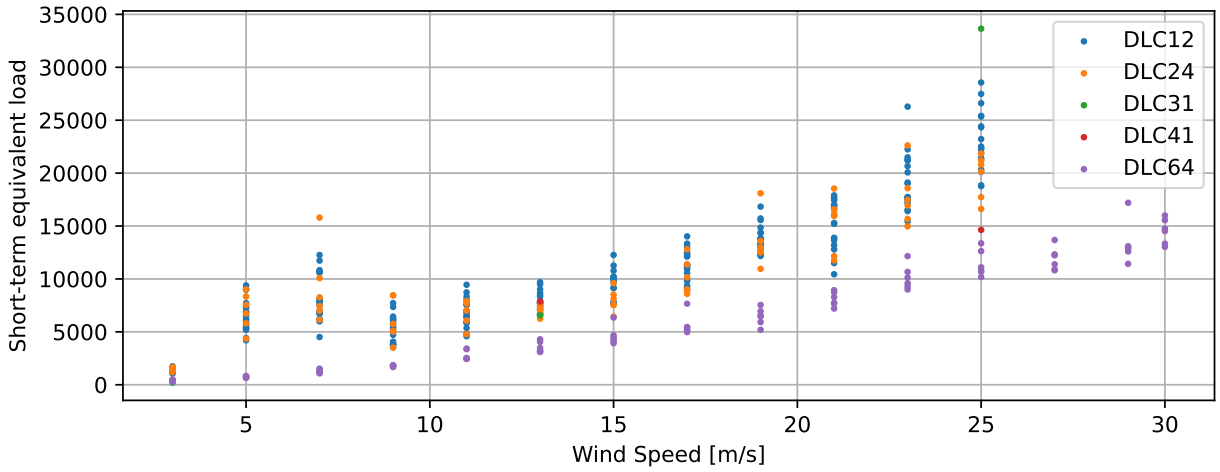

Contribution to Lifetime Damage [%]
99.58
0.17
0.25
0.00
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

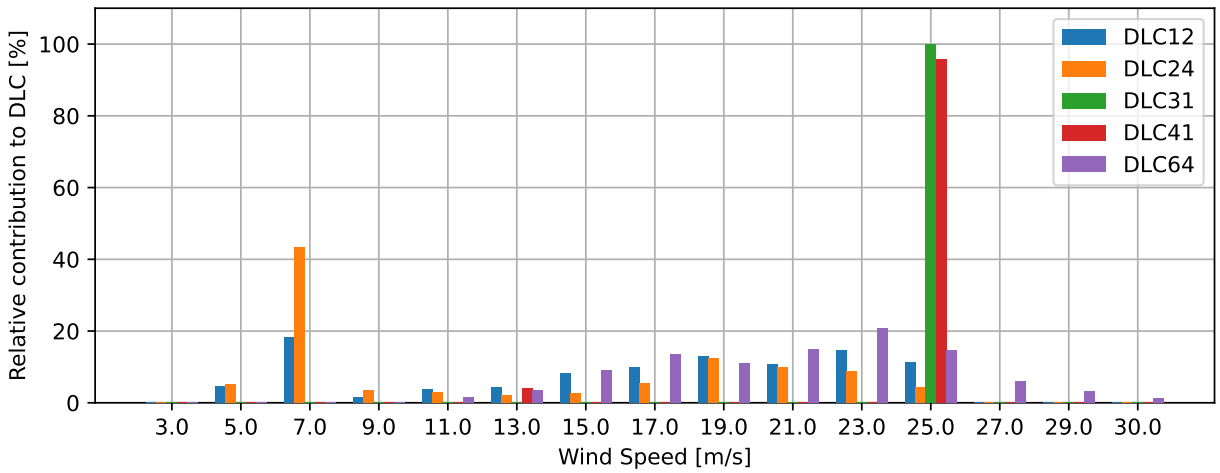

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

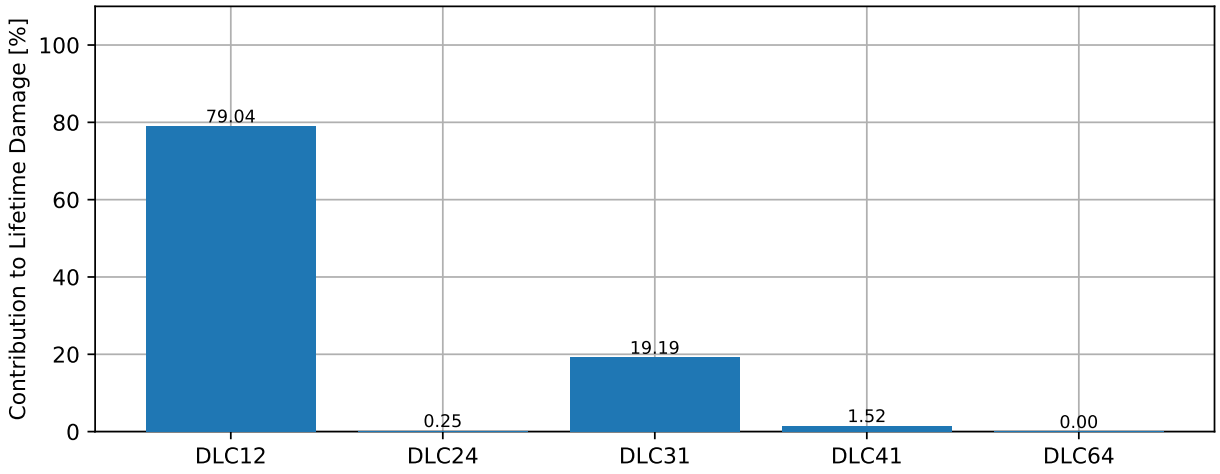
TwrBsMxt_[kN-m]

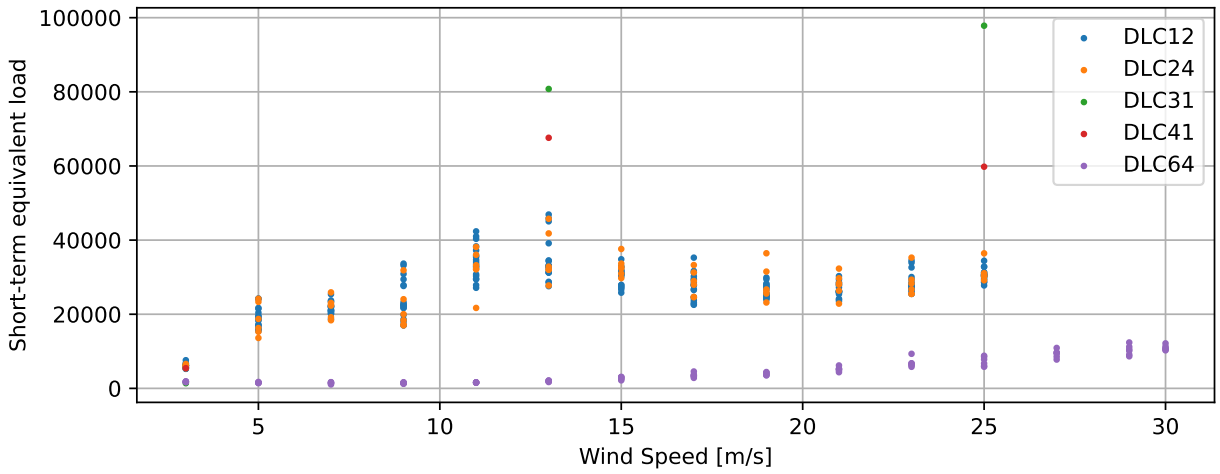


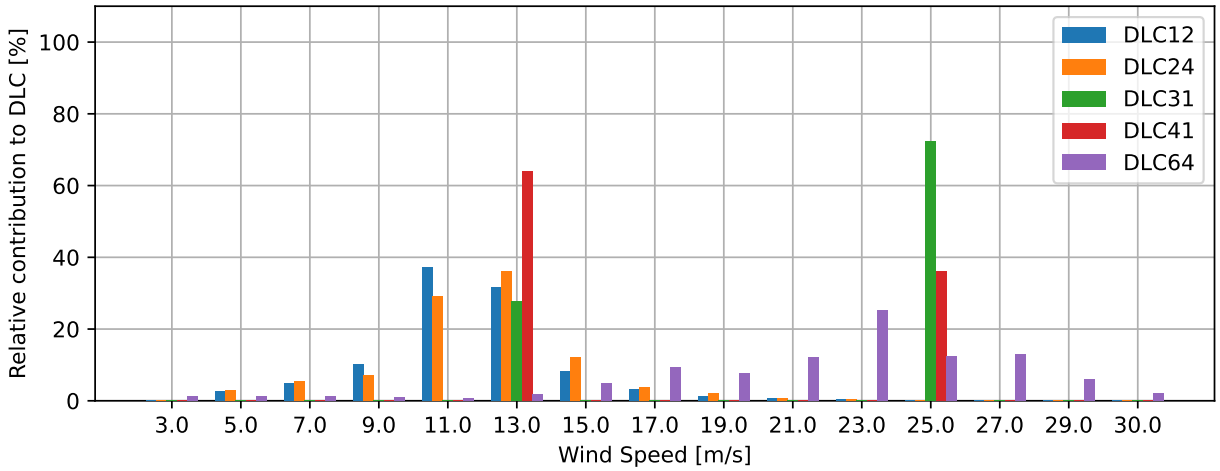




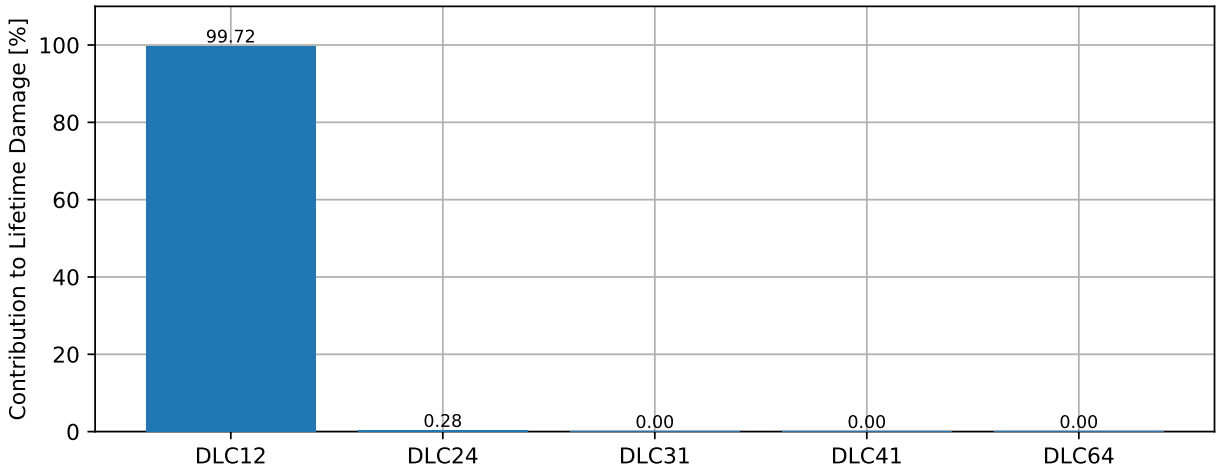
TwrBsMyt_[kN-m]

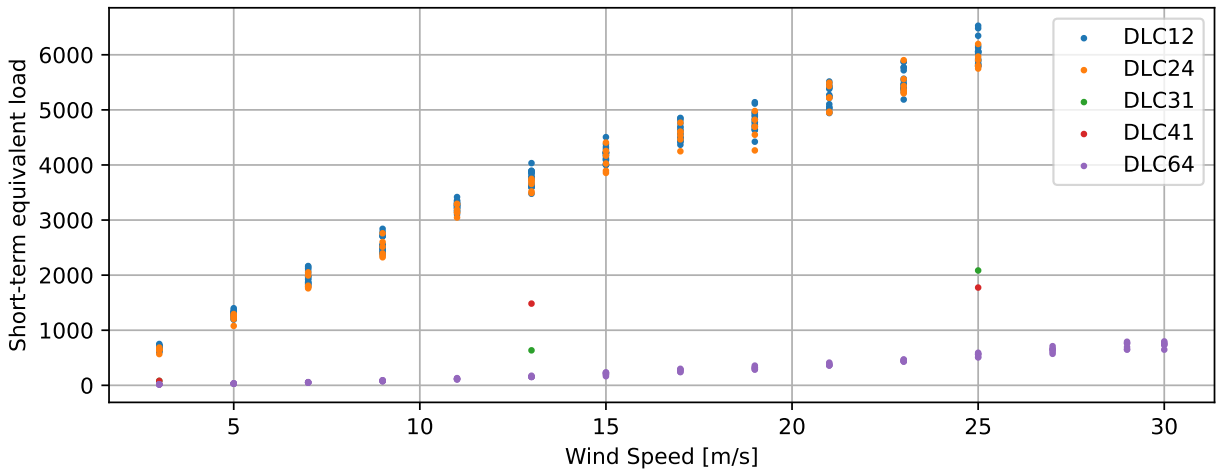


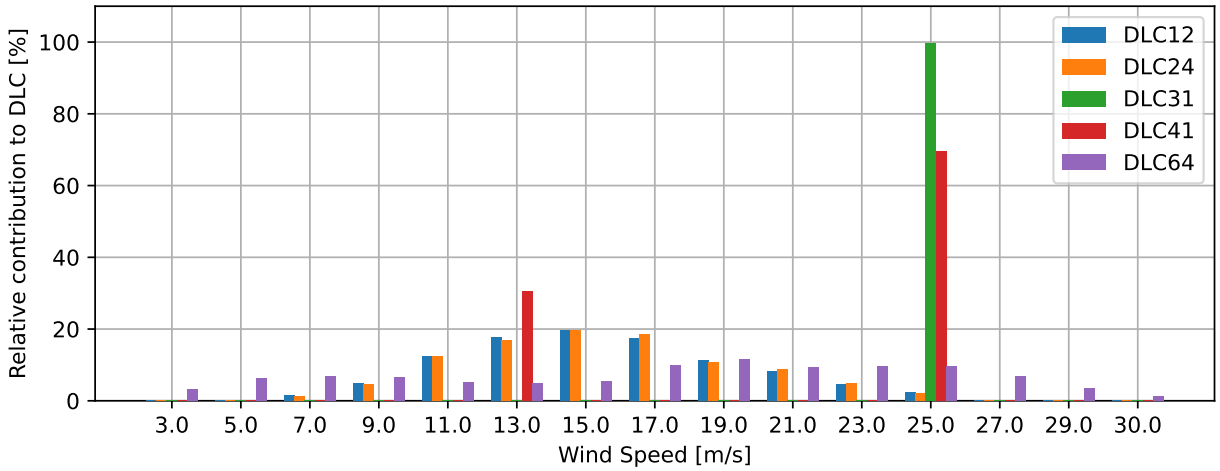




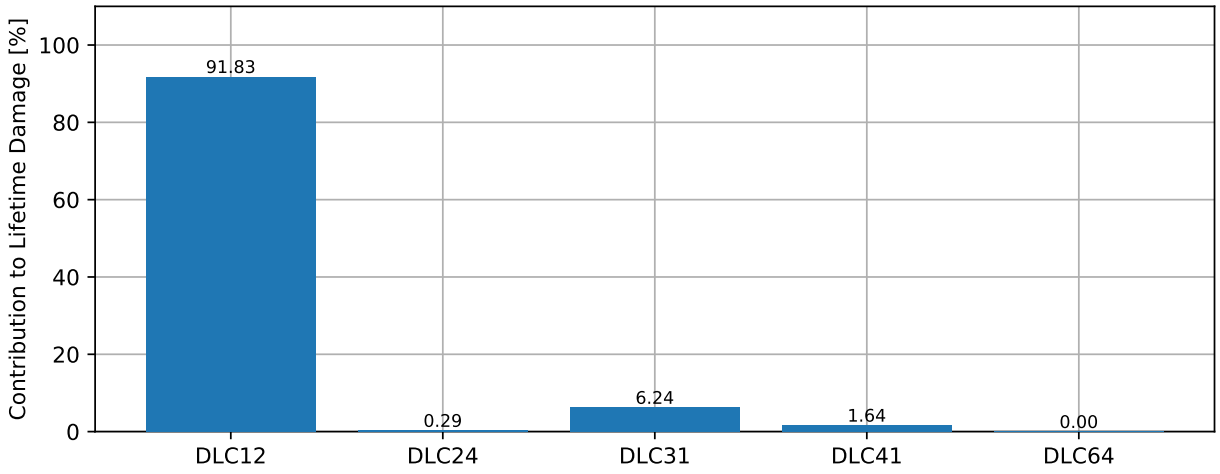
TwrBsMzt_[kN-m]

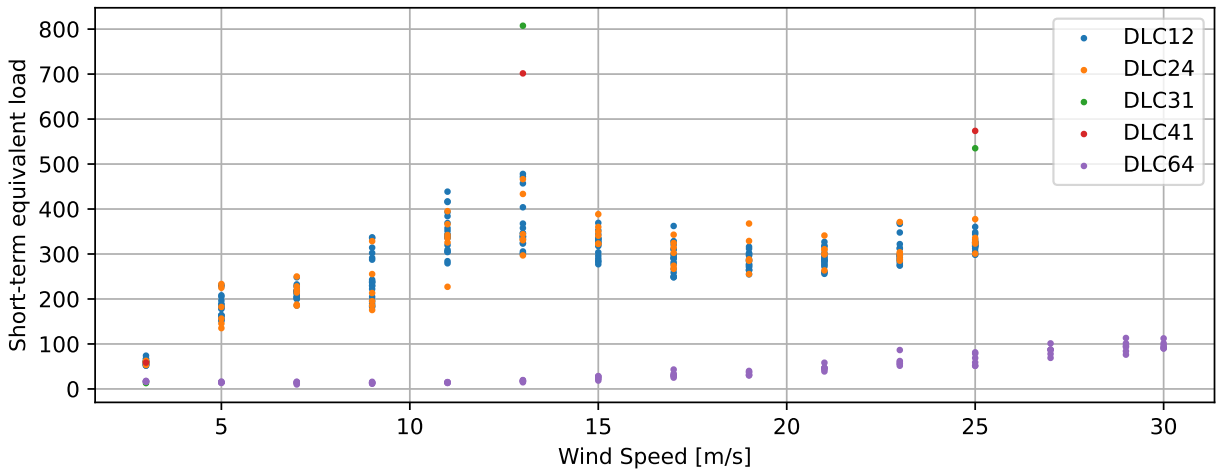


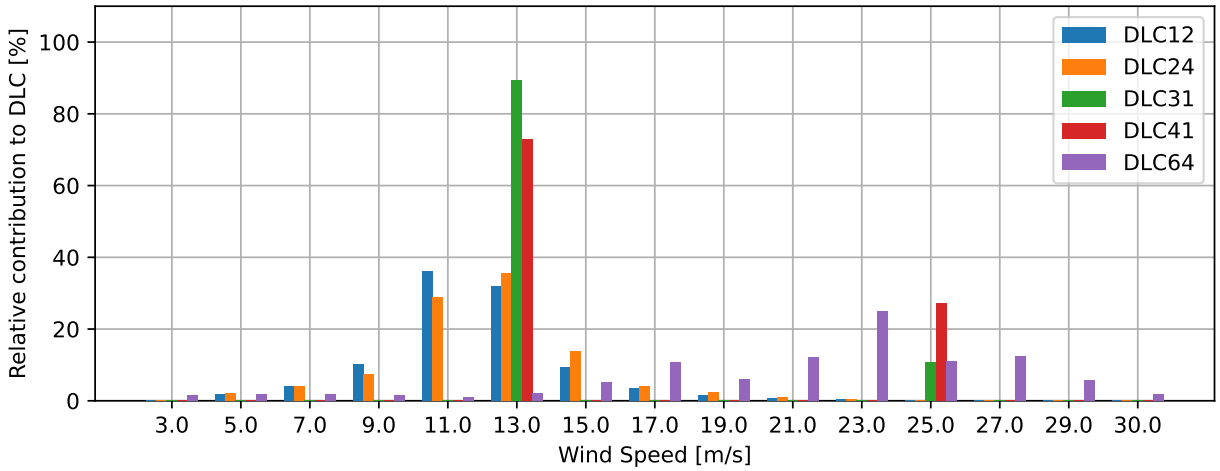




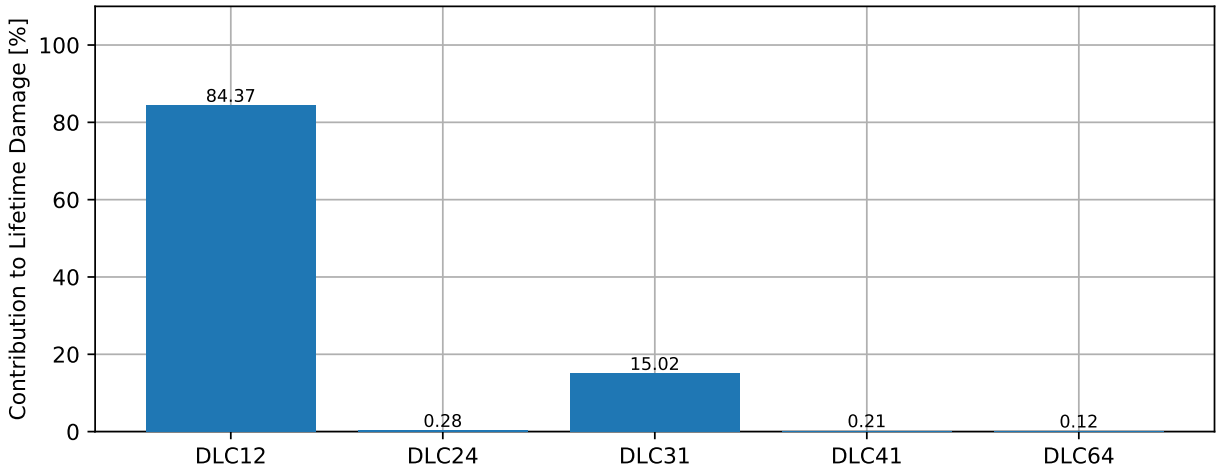
YawBrFxp_[kN]

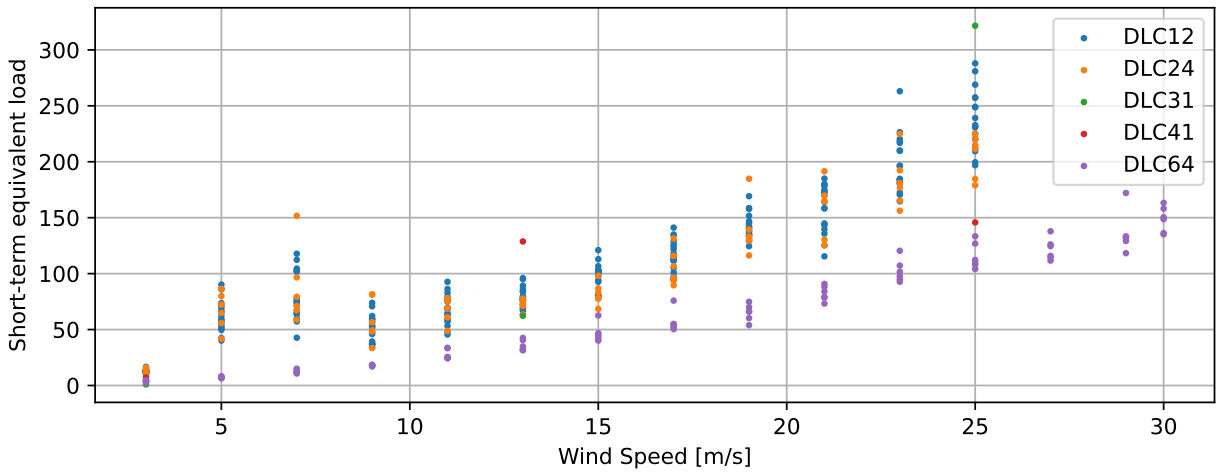

Contribution to Lifetime Damage [%]
91.83
0.29
6.24
1.64
0.00
DLC12
DLC24
DLC31
DLC41
DLC64

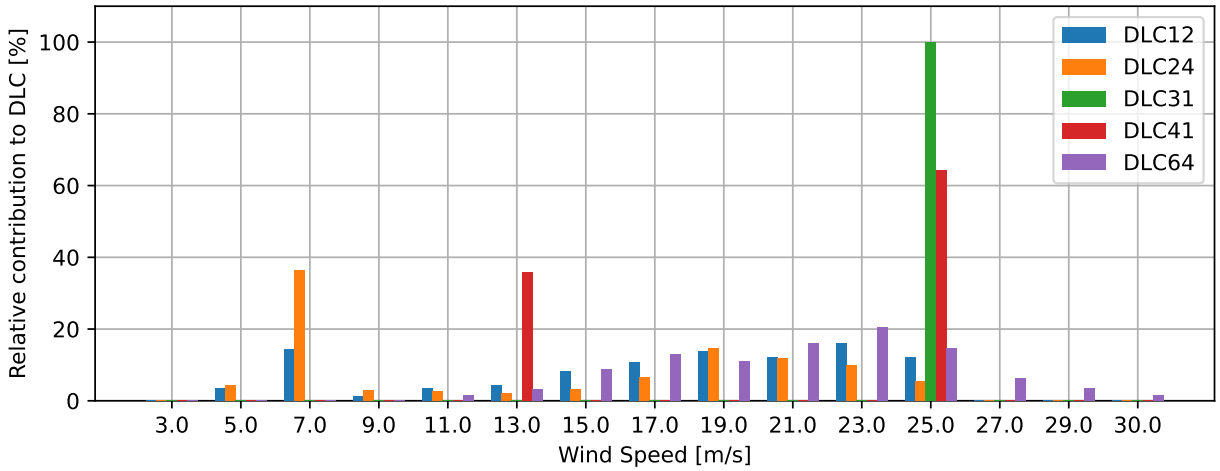

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

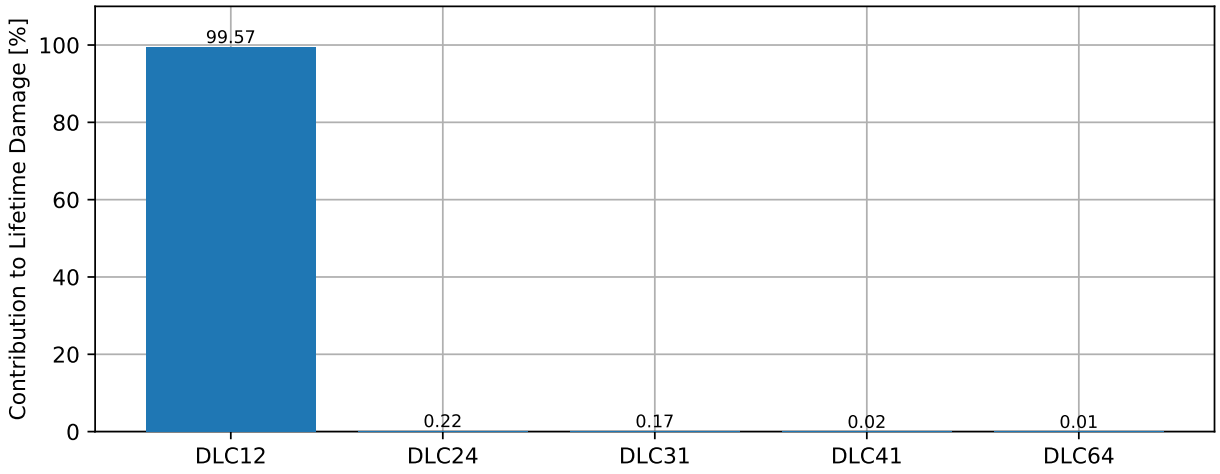
YawBrFyp_[kN]

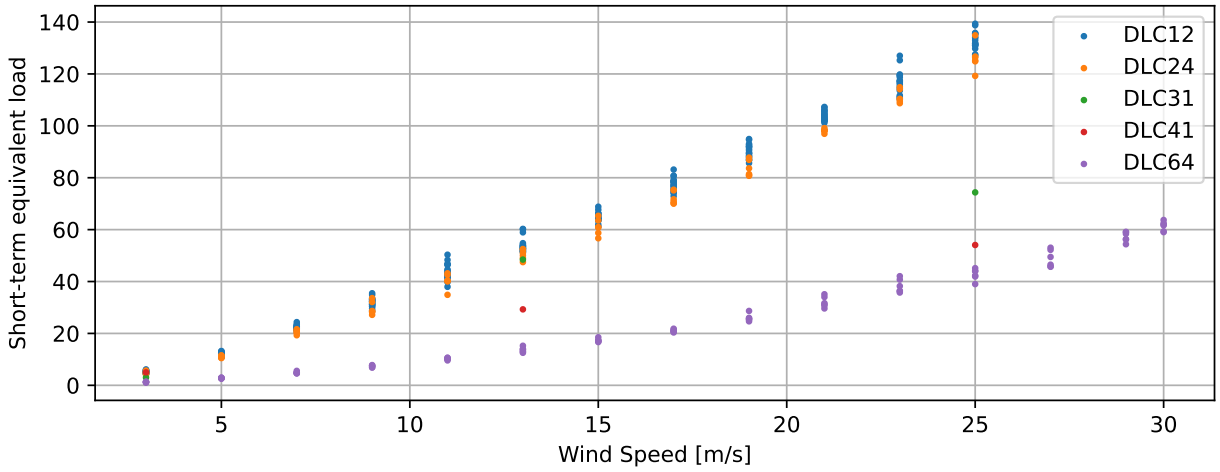

Contribution to Lifetime Damage [%]
84.37
0.28
15.02
0.21
0.12
DLC12
DLC24
DLC31
DLC41
DLC64

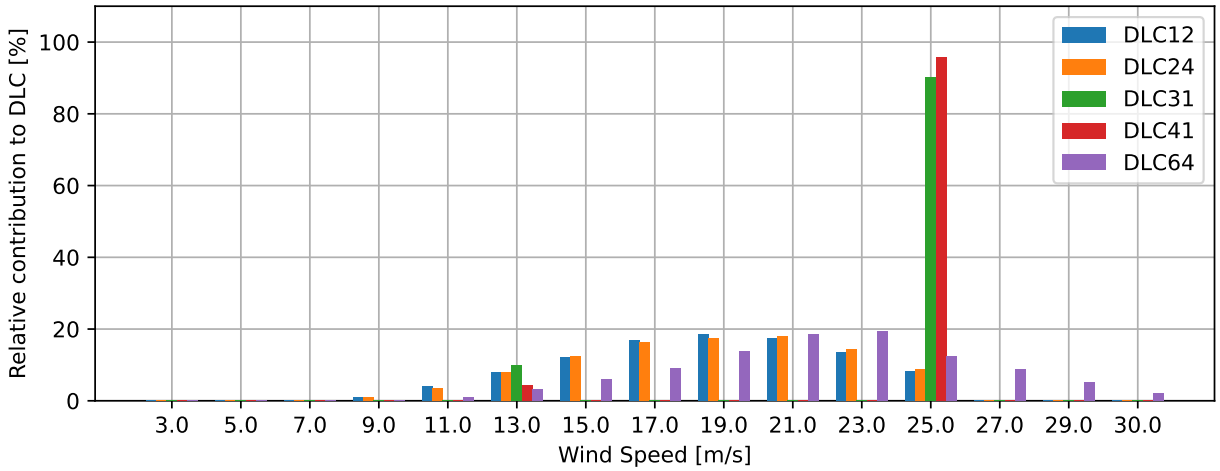

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

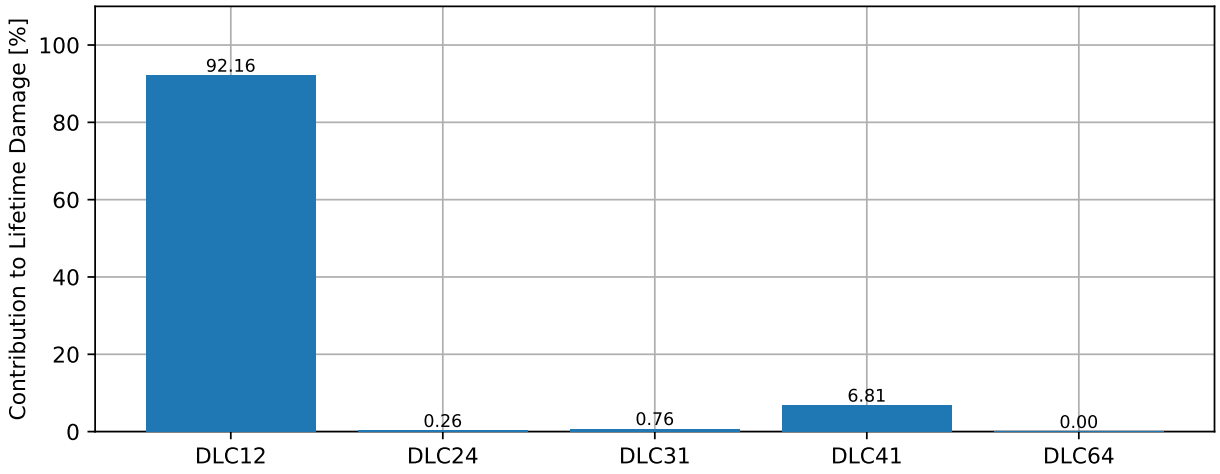
YawBrFzn_[kN]

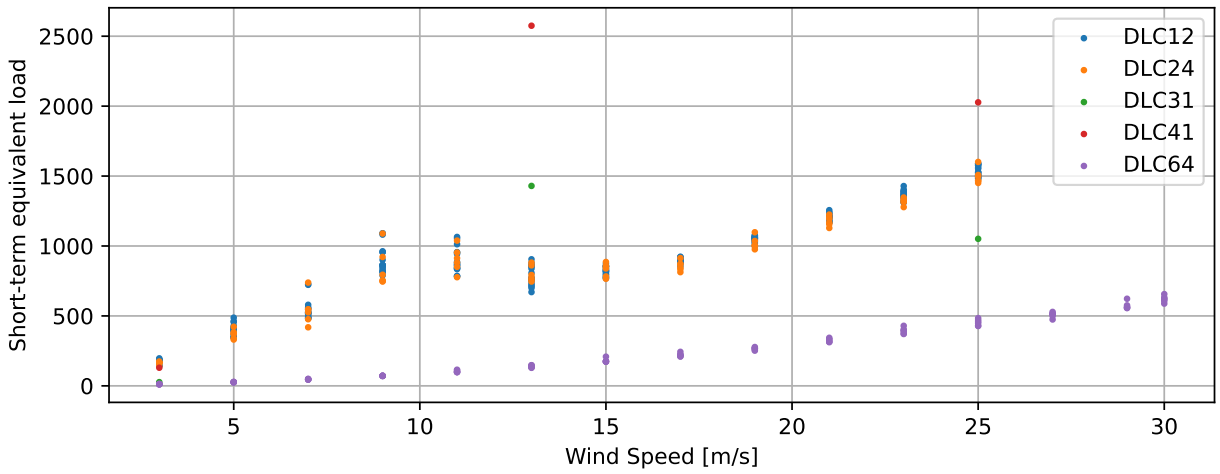

Contribution to Lifetime Damage [%]
99.57
0.22
0.17
0.02
0.01
DLC12
DLC24
DLC31
DLC41
DLC64

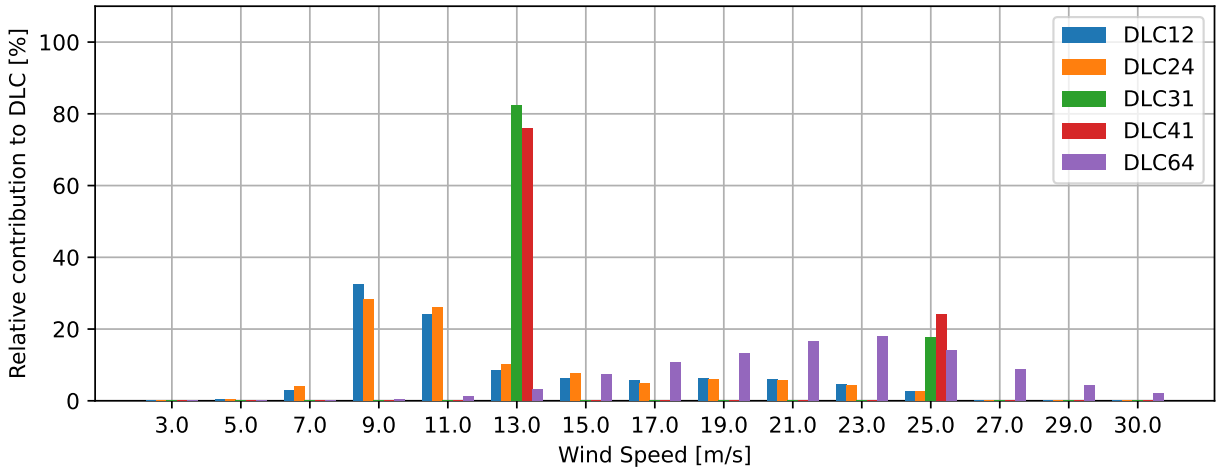

Short-term equivalent load
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64


Relative contribution to DLC [%]
Wind Speed [m/s]
DLC12
DLC24
DLC31
DLC41
DLC64

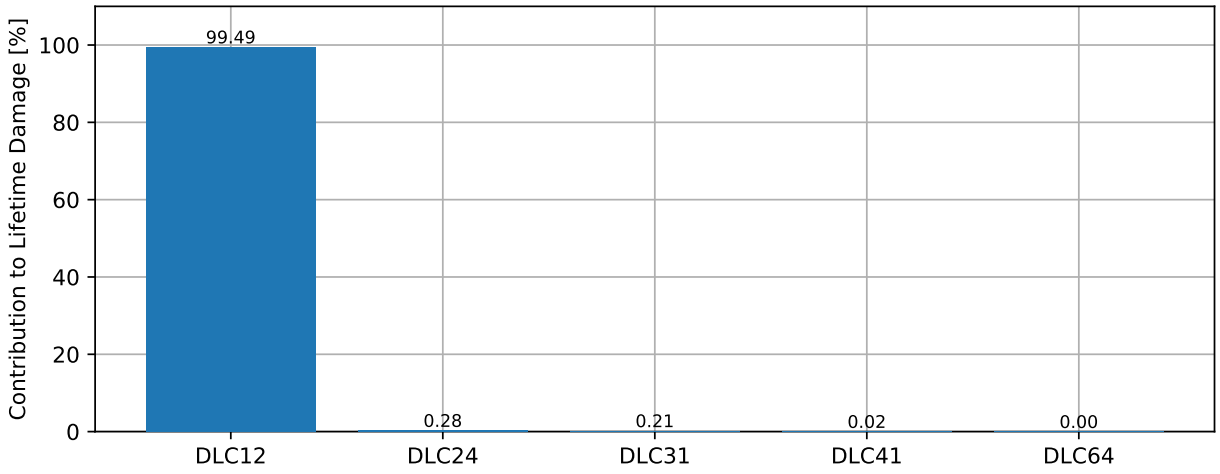
YawBrMxp_[kN-m]

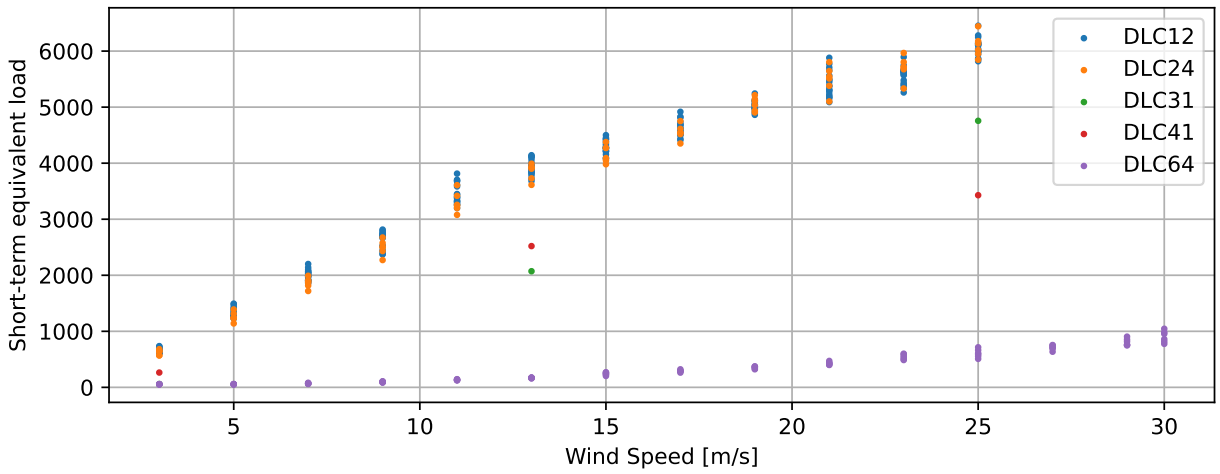


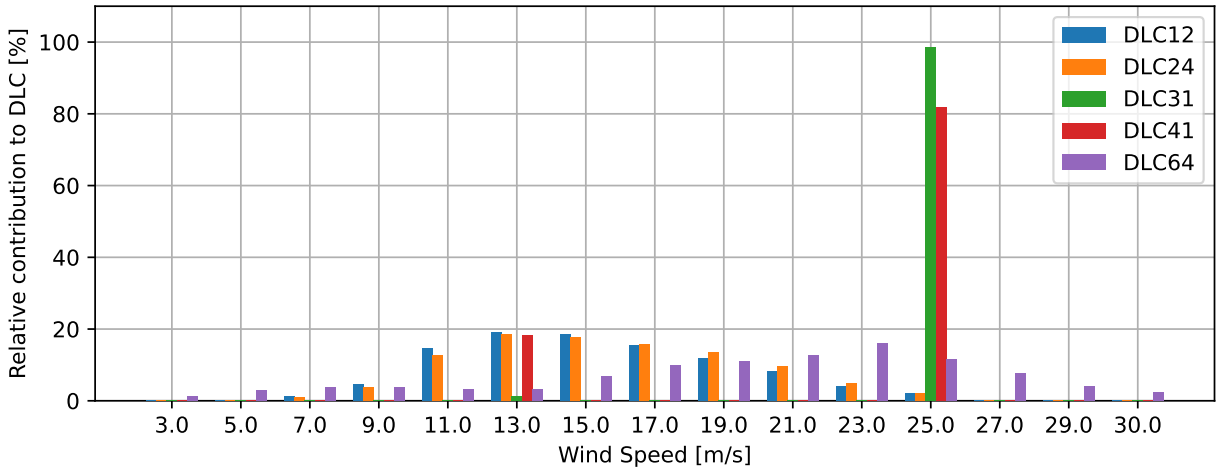




YawBrMyp_[kN-m]







YawBrMzn_[kN-m]