

LAMPIRAN D

HASIL RUNNING PROGRAM CIRCLY 6.0

• Job Summary File
CIRCLY - Version 6.0 (30 January 2015)

Job Title: Tugas Akhir
Damage Factor Calculation
Assumed number of damage pulses per movement:
Combined pulse for gear (i.e. ignore NROWS)

Traffic Spectrum Details:

Load No.	Load ID	Movements
1	ESA750-Full	1,78E+06

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/Ref. stress	Exponent
1	ESA750-Full	ESA750-Full	Vertical Force	92,1	0,75	0,00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA750-Full	1	-165,0	0,0	1,00E+00	0,00
2	ESA750-Full	1	165,0	0,0	1,00E+00	0,00
3	ESA750-Full	1	1635,0	0,0	1,00E+00	0,00
4	ESA750-Full	1	1965,0	0,0	1,00E+00	0,00

Layout of result points on horizontal plane:

Xmin: 0 Xmax: 165 Xdel: 165
Y: 0

Details of Layered System:

ID: TA-1 Title: Tugas Akhir

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	Asph2800	Iso.	2,80E+03	0,40			
2	rough	Cement11	Iso.	1,15E+01	0,20			
3	rough	Sub_CBR6a	Aniso.	6,34E+01	0,45	4,37E+01	3,17E+01	0,45

Performance Relationships:

Layer No.	Location	Material ID	Component	Perform. Constant	Perform. Exponent	Traffic Multiplier
1	bottom	Asph2800	ETH	0,005889	5,000	1,000
2	bottom	Cement11	ETH	0,000900	12,000	1,000
3	top	Sub_CBR6a	EZZ	0,009300	7,000	12,000

Reliability Factors:

Project Reliability: Austroads 90%

Layer No.	Reliability Factor	Material Type
1	1,50	Asphalt
2	2,00	Cement Stabilised
3	1,00	Subgrade (Austroads 2004)

Results:

Layer No.	Thickness	Material ID	Load ID	Critical Strain	CDF
1	160,00	Asph2800	ESA750-Full	-3,50E-04	8,81E-01
2	315,00	Cement11	ESA750-Full	-6,58E-05	2,08E-08
3	0,00	Sub_CBR6a	ESA750-Full	2,37E-04	1,50E-04

- Damaged File
Tugas Akhir

Asphalt- 2800MPa

Maximum damage values for each vehicle type

Vehicle Type	Damage Factor	Critical Strain
ESA750-Full	.88085E+00	-0.35007E-03

Maximum of total damage= 0.8808489

Cemented, E=11,48 MPa

Maximum damage values for each vehicle type

Vehicle Type	Damage Factor	Critical Strain
ESA750-Full	.20790E-07	-0.65809E-04

Maximum of total damage= 2.0790472E-08

Subgrade, CBR6,34

Maximum damage values for each vehicle type

Vehicle Type	Damage Factor	Critical Strain
ESA750-Full	.15017E-03	0.23724E-03

Maximum of total damage= 1.5016882E-04

- CLO. File

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*           Program- CIRCLY
*
*           Version- 6.0 (16 December 2014)
*
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*           LAYERS BLOCK WORKSPACE      (MLYBLK)... 125000
*           COORDINATES BLOCK WORKSPACE (MCOORD)...  5000
*
*           CONVERGENCE TOLERANCE        (EPS)... 1.0E-02
*           MINIMUM INTEGRATION RANGE     (RKUPMN)... 2.0E+00
*           MAXIMUM INTEGRATION RANGE     (RKNMTR)... 1.0E+01
*           MAXIMUM EXPONENTIAL FN. ARG. (EXPMAX)... 2.0E+01
*           MAXIMUM NODES IN QUADRATURE  (MXKNOD)...  127
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0DETAILS OF LAYERED SYSTEM

0NUMBER OF LAYERS..... 3

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LAYER	TYPE	ELASTIC CONSTANTS			THICKNESS	INTERFACE
0 1	ISOTROPIC	MODULUS = 0.2800E+04	POISSONS RATIO = 0.4000E+00		0.1600E+03	ROUGH
0 2	ISOTROPIC	MODULUS = 0.1148E+02	POISSONS RATIO = 0.2000E+00		0.3150E+03	ROUGH
0 3	CROSS-ANISOTROPIC	EH = 0.3170E+02	EV = 0.6340E+02	F = 0.4372E+02	INFINITE	

VVH= 0.4500E+00 VH = 0.4500E+00

0DETAILS OF LOADS Equivalent Single Axle (press=0.75 MPa)- Full Axle (Austroads 2004)

 0NUMBER OF LOAD GROUPS..... 1
 0NUMBER OF NON-DEFAULT LOAD LOCATIONS.... 4

0 LOAD

GROUP NO.	LOAD TYPE	RADIUS	REFERENCE STRESS	AVERAGE STRESS	LOAD/MOMENT PER LOCATION	POWER
1	(1) VERTICAL FORCE	0.9210E+02	0.7500E+00	0.7500E+00	0.1999E+05	0.0000E+00

NON-DEFAULT LOAD LOCATION DATA

LOAD GROUP NO.	X	Y	THETA (DEGREES)	SCALING FACTOR
1	-0.1650E+03	0.0000E+00	0.000	0.1000E+01
1	0.1650E+03	0.0000E+00	0.000	0.1000E+01
1	0.1635E+04	0.0000E+00	0.000	0.1000E+01
1	0.1965E+04	0.0000E+00	0.000	0.1000E+01

SOLUTION METHOD DETAILS

GAUSSIAN QUADRATURE USED FOR HANKEL TRANSFORM INTEGRATION.

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POINT	C O O R D I N A T E S				N O R M A L S T R E S S E S			S H E A R S T R E S S E S		
NO.	X	Y	Z	L	XX	YY	ZZ	XZ	YZ	XY
0 0.2027E-07	1	0.0000E+00	0.0000E+00	0.1600E+03	1	-0.9230E+00	-0.1339E+01	0.2646E-01	-0.4358E-03	-0.2336E-09
0 0.5822E-08	2	0.1650E+03	0.0000E+00	0.1600E+03	1	-0.1183E+01	-0.1441E+01	0.2677E-01	0.1374E-02	-0.5009E-10
0 0.1385E-10	3	0.0000E+00	0.0000E+00	0.4750E+03	2	0.4110E-02	0.3915E-02	0.1924E-01	-0.6459E-03	-0.1345E-09
0 0.1402E-10	4	0.1650E+03	0.0000E+00	0.4750E+03	2	0.4101E-02	0.3834E-02	0.1877E-01	0.5567E-03	-0.7543E-10
0 0.3164E-10	5	0.0000E+00	0.0000E+00	0.4750E+03	3	0.4889E-02	0.4443E-02	0.1924E-01	-0.6459E-03	-0.1345E-09
0 0.3203E-10	6	0.1650E+03	0.0000E+00	0.4750E+03	3	0.5071E-02	0.4462E-02	0.1877E-01	0.5567E-03	-0.7543E-10