INPUT FILE NAME -C :\KENPAVE Bina Marga.DAT

NUMBER OF PROBLEM TO BE SOLVED = 1

TITTLE = 1987

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA = 0 SO DAMAGE ANALYSIS WILL NOT BE PERFORMED
NUMBER OF PERIOD PER YEAR (NPY) = 1
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DL) = 0,001
NUMBER OF LAYERS (NL) = 4
NUMBER OF COORDINATES (NZ) = 5
LIMT OF INTEGRATION CYCLES (ICL) = 80
COMPUTING CODE (NSTD) = 9
SYSTEM OF UNITS (NUNIT) = 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 15 20 20
POISSON'S RATIOS OF LAYERS (PR) ARE : 0,35 0,4 0,4 0,45
VERTICAL COORDINATES OF POINTS (ZC) ARE : 0 15 15,001 55 55,001
ALL INTERFACES ARE FULLY BONED

FOR PERIOD NO. 1 LAYER NO. AND MODULUSE : 1 2,547E+06 2 ; 2,11E+05 ; 3 1,57E+05 4 8,73E+003

LOAD GROUP NO.1 HAS 4 CONTACT AREAS
CONTACT RADIUS (CR) = 9
CONTACT PRESSURE (CP) = 911
NO. POINTS AT WHICH RESULTS ARE DESIRED (NPT) = 9
WHEEL SPACING ALONG Y-AXIS (YW) = 31
WHEEL SPACING ALONG X-AXIS (XW) = 132

RESPONSE PT. NO. AND (XPT, YPT) ARE : 1 0,000 0,000 ; 2 0,000 9,260 ; 3 0,000 65,530 ; 4 0,000 32,770 ; 5 32,770 9,260 ; 6 32,770 65,530 ; 7 0,000 65,530 ; 8 65,530 9,260 ; 9 65,530 65,530

PERIOD NO.1 LOAD GROUP NO.1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL (STRAIN)	MINOR PRINCIPAL (STRAIN)	INTERMEDIATE P. STRESS (HORIZONTAL P. STRAIN)
1	0	0,31002	911	2219,553	906,864	2077,757
	(STRAIN)		-2,37E-04	4,67E-04	-2,37E-04	3,89E-04
1	10	0,30875	222,012	222,795	-1350,197	-1148,795
	(STRAIN)		4,36E-04	4,36E-04	-4,08E-04	-4,08E-04
1	10,001	0,30875	221,994	227,489	15,15	26,626
	(STRAIN)		9,62E-04	9,99E-04	-4,10E-04	-4,08E-04
1	50	0,28154	13,566	13,605	-101,849	-92,613
	(STRAIN)		7,90E-04	7,90E-04	-6,07E-04	-6,20E-04
1	50,001	0,28154	13,565	13,938	1,826	2,501
	(STRAIN)		1,31E-03	1,37E-03	-6,38E-04	-6,20E-04
2	0	0,31133	0	1448,026	-78,648	824,714
	(STRAIN)		-3,47E-04	4,72E-04	-3,47E-04	1,37E-04
2	10	0,31125	174,658	175,087	-1078,827	-517,845
	(STRAIN)		2,91E-04	2,92E-04	-3,81E-04	-3,81E-04
2	10,001	0,31125	174,65	177,217	12,326	55,83
	(STRAIN)		6,93E-04	7,10E-04	-3,83E-04	-3,81E-04
2	50	0,28422	14,079	14,099	-108,439	-97,671
	(STRAIN)		8,35E-04	8,35E-04	-6,49E-04	-6,51E-04
2	50,001	0,28422	14,079	14,27	1,836	2,494
	(STRAIN)		1,38E-03	1,41E-03	-6,54E-04	-6,51E-04
3	0	0,26752	0	391,973	0,943	135,934
	(STRAIN)		-7,31E-05	1,37E-04	-7,31E-05	-7,18E-06
3	10	0,2679	10,458	154,811	-93,541	-2,26
	(STRAIN)		-2,60E-06	7,48E-05	-5,84E-05	-5,85E-05
3	10,001	0,2679	10,458	57,88	-29,496	-0,597
	(STRAIN)		1,67E-05	3,31E-04	-2,48E-04	-5,85E-05
3	50	0,2586	9,547	9,751	-58,577	-45,432
	(STRAIN)		4,42E-04	4,44E-04	-3,83E-04	-4,39E-04
3	50,001	0,25859	9,547	11,04	1,983	2,55
	(STRAIN)		7,83E-04	1,03E-03	-4,73E-04	-4,39E-04
4	0	0,30872	911	2188,66	906,554	2051,129
	(STRAIN)		-2,29E-04	4,58E-04	-2,29E-04	3,83E-04
4	10	0,30745	216,557	218,171	-1319,156	-1123,06
	(STRAIN)		4,26E-04	4,26E-04	-3,98E-04	-3,98E-04
4	10,001	0,30745	216,54	227,542	14,328	20,437
	(STRAIN)		9,39E-04	1,01E-03	-4,02E-04	-3,98E-04
4	50	0,2808	13,423	13,467	-100,014	-91,169
	(STRAIN)		7,77E-04	7,78E-04	-5,96E-04	-6,12E-04
4	50,001	0,2808	13,423	13,845	1,826	2,504
	(STRAIN)		1,29E-03	1,36E-03	-6,34E-04	-6,12E-04
5	0	0,30353	0	577,729	1,196	178,793
	(STRAIN)		-1,05E-04	2,05E-04	-1,05E-04	-1,14E-05
5	10	0,30406	16,315	171,379	-109,633	8,585
	(STRAIN)		-1,03E-06	8,22E-05	-6,86E-05	-7,05E-05
5	10,001	0,30406	16,315	55,204	-15,73	1,899
	(STRAIN)		2,98E-05	2,88E-04	-1,83E-04	-7,05E-05
5	50	0,29062	12,402	12,414	-91,132	-60,589
	(STRAIN)		6,32E-04	6,32E-04	-6,21E-04	-6,23E-04
5	50,001	0,29062	12,401	12,513	2,082	4,246
	(STRAIN)		1,09E-03	1,11E-03	-6,25E-04	-6,23E-04
6	0	0,27468	0	290,291	-3,49	160,945
	(STRAIN)		-6,41E-05	9,35E-05	-6,41E-05	-1,04E-05
6	10	0,27505	3,186	105,188	-28,937	2,213
	(STRAIN)		-9,20E-06	4,55E-05	-2,64E-05	-5,52E-05
6	10,001	0,27505	3,186	36,129	-24,497	2,326
	(STRAIN)		-5,32E-06	2,13E-04	-1,89E-04	-5,52E-05
6	50	0,2671	9,411	9,549	-49,114	-42,483
	(STRAIN)		3,98E-04	3,99E-04	-3,11E-04	-3,38E-04
6	50,001	0,2671	9,411	10,502	2,166	3,579
	(STRAIN)		7,26E-04	9,07E-04	-4,78E-04	-3,38E-04
7	0	0,26752	0	391,973	0,943	135,934
	(STRAIN)		-7,31E-05	1,37E-04	-7,31E-05	-7,18E-06
7	10	0,2679	10,458	154,811	-93,541	-2,26
	(STRAIN)		-2,60E-06	7,48E-05	-5,84E-05	-5,85E-05
7	10,001	0,2679	10,458	57,88	-29,496	-0,597
	(STRAIN)		1,67E-05	3,31E-04	-2,48E-04	-5,85E-05
7	50	0,2586	9,547	9,751	-58,577	-45,432
	(STRAIN)		4,42E-04	4,44E-04	-3,83E-04	-4,39E-04
7	50,001	0,25859	9,547	11,04	1,983	2,55
	(STRAIN)		7,83E-04	1,03E-03	-4,73E-04	-4,39E-04
8	0	0,29844	0	464,043	-4,227	102,014
	(STRAIN)		-8,04E-05	1,71E-04	-8,04E-05	-2,34E-05
8	10	0,2989	1,778	137,786	-51,127	2,082
	(STRAIN)		-1,14E-05	6,16E-05	-3,98E-05	-3,96E-05
8	10,001	0,2989	1,778	12,675	-4,962	4,159
	(STRAIN)		-1,07E-05	6,16E-05	-5,54E-05	-3,96E-05
8	50	0,28922	11,025	11,027	-77,426	-36,6
	(STRAIN)		4,90E-04	4,90E-04	-5,81E-04	-5,81E-04
8	50,001	0,28922	11,025	11,044	2,213	5,208
	(STRAIN)		8,79E-04	8,83E-04	-5,84E-04	-5,81E-04
9	0	0,27512	0	261,075	-0,071	155,422
	(STRAIN)		-5,80E-05	8,21E-05	-5,80E-05	2,55E-05
9	10	0,27546	1,588	60,087	-15,034	27,639
	(STRAIN)		-9,26E-06	2,21E-05	-1,82E-05	-4,20E-06
9	10,001	0,27546	1,588	22,718	-18,905	6,194
	(STRAIN)		-8,43E-06	1,32E-04	-1,44E-04	-4,21E-06
9	50	0,26843	9,028	9,138	-46,176	-33,172
	(STRAIN)		3,52E-04	3,53E-04	-3,16E-04	-3,15E-04
9	50,001	0,26843	9,028	9,924	2,263	4,099
	(STRAIN)		6,60E-04	8,09E-04	-4,64E-04	-3,15E-04

INPUT FILE NAME -C :\KENPAVE AASHTO.DAT

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TITTLE = 1993

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NDAMA = 0 SO DAMAGE ANALYSIS WILL NOT BE PERFORMED
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NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DL) = 0,001
NUMBER OF LAYERS (NL) = 4
NUMBER OF COORDINATES (NZ) = 5
LIMT OF INTEGRATION CYCLES (ICL) = 80
COMPUTING CODE (NSTD) = 9
SYSTEM OF UNITS (NUNIT) = 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 15 10 20
POISSON'S RATIOS OF LAYERS (PR) ARE : 0,35 0,4 0,4 0,45
VERTICAL COORDINATES OF POINTS (ZC) ARE : 0 15 15,001 45 45,001
ALL INTERFACES ARE FULLY BONED

FOR PERIOD NO. 1 LAYER NO. AND MODULUSE : 1 2,547E+06 2 ; 2,11E+05 ; 3 1,57E+05 4 8,73E+003

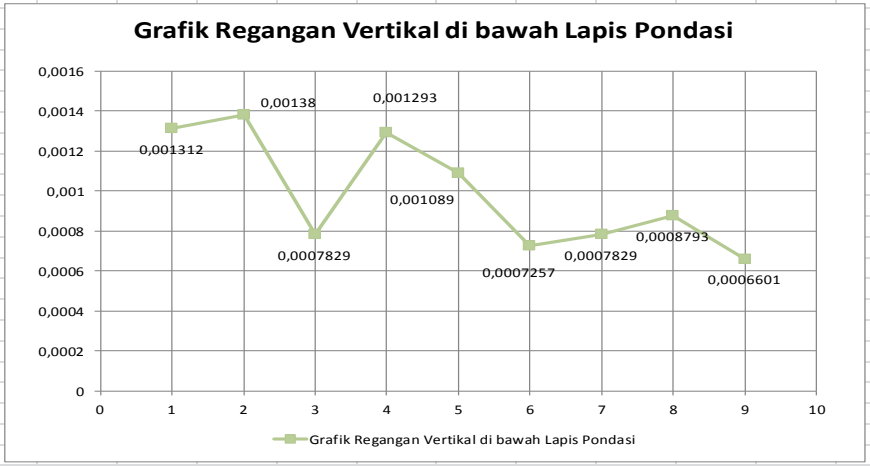
LOAD GROUP NO.1 HAS 4 CONTACT AREAS
CONTACT RADIUS (CR) = 9
CONTACT PRESSURE (CP) = 911
NO. POINTS AT WHICH RESULTS ARE DESIRED (NPT) = 9
WHEEL SPACING ALONG Y-AXIS (YW) = 31
WHEEL SPACING ALONG X-AXIS (XW) = 132

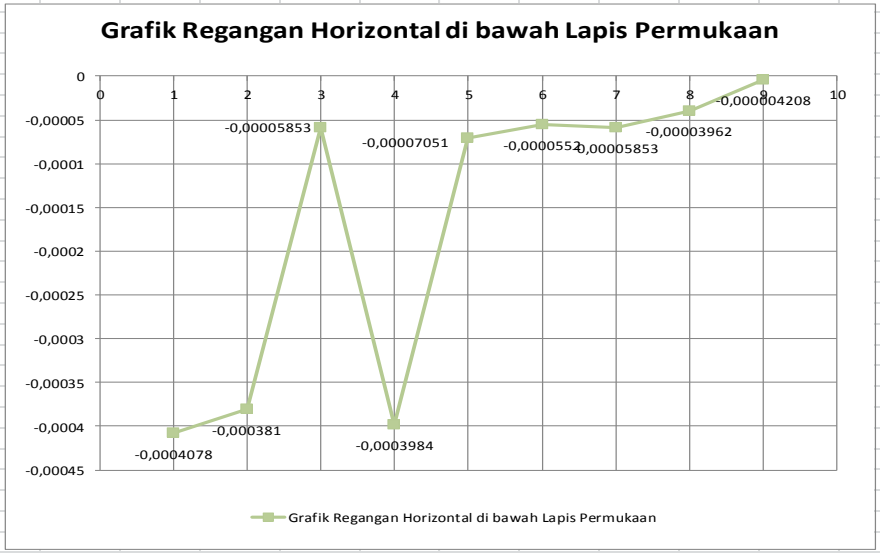
RESPONSE PT. NO. AND (XPT, YPT) ARE : 1 0,000 0,000 ; 2 0,000 9,260 ; 3 0,000 65,530 ; 4 0,000 32,770 ; 5 32,770 9,260 ; 6 32,770 65,530 ; 7 0,000 65,530 ; 8 65,530 9,260 ; 9 65,530 65,530

PERIOD NO.1 LOAD GROUP NO.1

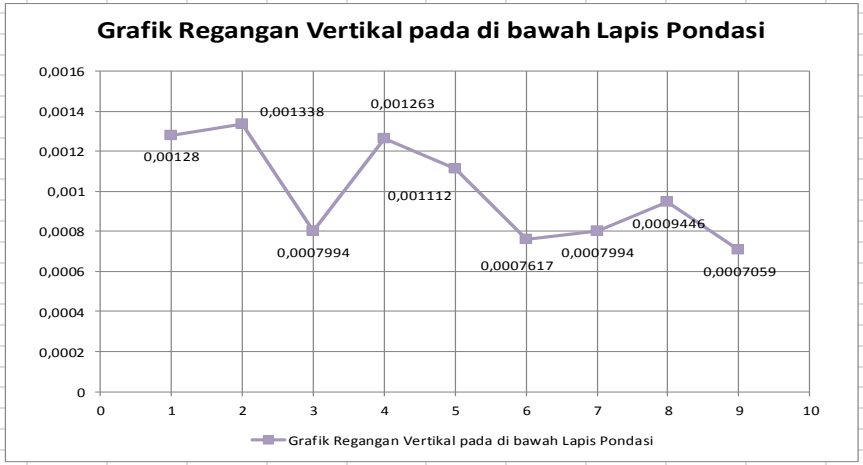
POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL (STRAIN)	MINOR PRINCIPAL (STRAIN)	INTERMEDIATE P. STRESS (HORIZONTAL P. STRAIN)
1	0	0,31394	911	1857,059	906,864	1800,917
	(STRAIN)		-1,48E-04	3,61E-04	-1,48E-04	3,26E-04
1	15	0,31181	105,791	106,409	-1129,945	-1032,399
	(STRAIN)		3,43E-04	3,43E-04	-3,20E-04	-3,22E-04
1	15,001	0,31181	105,782	110,817	-37,082	-33,689
	(STRAIN)		6,26E-04	6,59E-04	-3,22E-04	-3,22E-04
1	45	0,29343	13,964	14,004	-97,224	-86,318
	(STRAIN)		7,55E-04	7,56E-04	-5,91E-04	-6,02E-04
1	45,001	0,29343	13,964	14,335	2,542	3,295
	(STRAIN)		1,28E-03	1,34E-03	-6,18E-04	-6,02E-04
2	0	0,3153	0	1201,036	-78,648	818,867
	(STRAIN)		-3,12E-04	3,74E-04	-3,12E-04	1,69E-04
2	15	0,31482	90,683	90,721	-1053,304	-809,087
	(STRAIN)		2,95E-04	2,95E-04	-3,19E-04	-3,19E-04
2	15,001	0,31482	90,677	91,011	-38,794	-18,741
	(STRAIN)		5,38E-04	5,40E-04	-3,21E-04	-3,19E-04
2	45	0,29607	14,414	14,437	-102,801	-90,592
	(STRAIN)		7,93E-04	7,94E-04	-6,25E-04	-6,27E-04
2	45,001	0,29607	14,414	14,625	2,568	3,303
	(STRAIN)		1,34E-03	1,37E-03	-6,30E-04	-6,27E-04
3	0	0,27813	0	459,32	0,943	247,064
	(STRAIN)		-9,79E-05	1,48E-04	-9,79E-05	2,27E-05
3	15	0,27844	13,846	27,008	-287,1	-91,998
	(STRAIN)		5,64E-05	6,35E-05	-1,05E-04	-1,10E-04
3	15,001	0,27844	13,846	45,027	-30,841	-16,492
	(STRAIN)		9,62E-05	3,03E-04	-2,00E-04	-1,10E-04
3	45	0,27023	10,212	10,408	-57,206	-45,049
	(STRAIN)		4,41E-04	4,44E-04	-3,75E-04	-4,37E-04
3	45,001	0,27023	10,212	11,642	2,558	3,198
	(STRAIN)		7,99E-04	1,04E-03	-4,72E-04	-4,37E-04
4	0	0,31287	911	1835,957	906,554	1777,536
	(STRAIN)		-1,42E-04	3,56E-04	-1,42E-04	3,19E-04
4	15	0,31076	103,269	104,289	-1105,784	-1007,809
	(STRAIN)		3,35E-04	3,35E-04	-3,14E-04	-3,15E-04
4	15,001	0,31076	103,26	111,381	-36,893	-35,614
	(STRAIN)		6,11E-04	6,65E-04	-3,18E-04	-3,15E-04
4	45	0,29271	13,837	13,881	-95,622	-85,077
	(STRAIN)		7,44E-04	7,45E-04	-5,81E-04	-5,95E-04
4	45,001	0,29271	13,837	14,252	2,538	3,294
	(STRAIN)		1,26E-03	1,33E-03	-6,14E-04	-5,95E-04
5	0	0,31654	0	711,462	1,196	334,908
	(STRAIN)		-1,45E-04	2,36E-04	-1,45E-04	3,22E-05
5	15	0,31698	20,635	25,988	-440,428	-128,779
	(STRAIN)		8,66E-05	8,95E-05	-1,61E-04	-1,63E-04
5	15,001	0,31698	20,635	40,49	-26,69	-18,916
	(STRAIN)		1,47E-04	2,78E-04	-1,67E-04	-1,63E-04
5	45	0,30511	13,28	13,286	-89,536	-60,322
	(STRAIN)		6,33E-04	6,33E-04	-6,12E-04	-6,12E-04
5	45,001	0,30511	13,28	13,34	2,878	4,995
	(STRAIN)		1,11E-03	1,12E-03	-6,15E-04	-6,12E-04
6	0	0,28749	0	343,849	-3,49	228,241
	(STRAIN)		-8,10E-05	1,05E-04	-8,10E-05	1,31E-05
6	15	0,28779	8,63	15,642	-191,025	-80,704
	(STRAIN)		4,03E-05	4,40E-05	-6,69E-05	-9,73E-05
6	15,001	0,28779	8,63	30,179	-26,31	-8,636
	(STRAIN)		6,63E-05	2,09E-04	-1,66E-04	-9,73E-05
6	45	0,28049	10,286	10,422	-49,18	-43,524
	(STRAIN)		4,09E-04	4,11E-04	-3,11E-04	-3,22E-04
6	45,001	0,28049	10,286	11,358	2,789	4,22
	(STRAIN)		7,62E-04	9,40E-04	-4,84E-04	-3,22E-04
7	0	0,27813	0	459,32	0,943	247,064
	(STRAIN)		-9,79E-05	1,48E-04	-9,79E-05	2,27E-05
7	15	0,27844	13,846	27,008	-287,1	-91,998
	(STRAIN)		5,64E-05	6,35E-05	-1,05E-04	-1,10E-04
7	15,001	0,27844	13,846	45,027	-30,841	-16,492
	(STRAIN)		9,62E-05	3,03E-04	-2,00E-04	-1,10E-04
7	45	0,27023	10,212	10,408	-57,206	-45,049
	(STRAIN)		4,41E-04	4,44E-04	-3,75E-04	-4,37E-04
7	45,001	0,27023	10,212	11,642	2,558	3,198
	(STRAIN)		7,99E-04	1,04E-03	-4,72E-04	-4,37E-04
8	0	0,314	0	564,964	-4,227	145,782
	(STRAIN)		-1,01E-04	2,05E-04	-1,01E-04	-2,01E-05
8	15	0,31439	8,887	8,928	-325,926	0,324
	(STRAIN)		4,88E-05	4,88E-05	-1,31E-04	-1,31E-04
8	15,001	0,31439	8,887	9,321	-22,932	3,888
	(STRAIN)		7,74E-05	8,03E-05	-1,34E-04	-1,31E-04
8	45	0,30523	12,237	12,239	-78,668	-40,505
	(STRAIN)		5,18E-04	5,18E-04	-5,82E-04	-5,82E-04
8	45,001	0,30523	12,237	12,257	3,024	5,825
	(STRAIN)		9,45E-04	9,48E-04	-5,86E-04	-5,82E-04
9	0	0,28881	0	306,412	-0,071	180,503
	(STRAIN)		-6,78E-05	9,67E-05	-6,78E-05	2,91E-05
9	15	0,28909	6,012	8,371	-150,77	-53,653
	(STRAIN)		3,05E-05	3,18E-05	-5,36E-05	-5,24E-05
9	15,001	0,28909	6,013	19,055	-22,343	-1,636
	(STRAIN)		4,92E-05	1,36E-04	-1,39E-04	-5,24E-05
9	45	0,28261	10,001	10,117	-47,179	-34,764
	(STRAIN)		3,70E-04	3,71E-04	-3,23E-04	-3,21E-04
9	45,001	0,28261	10,001	10,928	2,89	4,713
	(STRAIN)		7,06E-04	8,60E-04	-4,75E-04	-3,21E-04

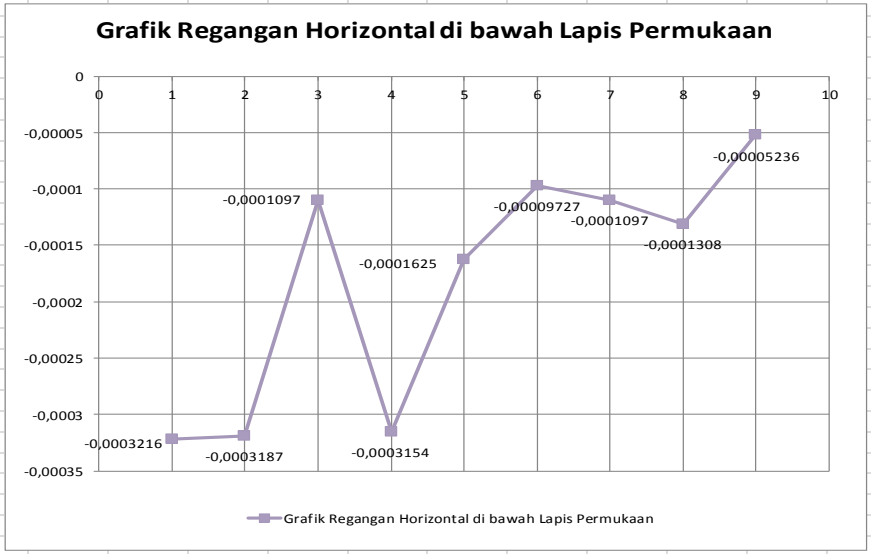
METODE ANALISA KOMPONEN DARI BINA MARGA 1987





METODE AASHTO 1993





PERHITUNGAN ANALISA KERUSAKAN

Perhitungan tebal Perkerasan	Regangan di bawah Lapis Permukaan	Regangan Di atas tanah dasar	Modulus Elastisitas Lapis Permukaan (kPa)
Metode Bina Marga 1987	0,000408	0,00138	2516586,4
Metode AASHTO 1993	0,000322	0,00134	

- **Model Retak *The Asphalt Institute* (1982)**

  $N_f = 0{,}0796\ (\varepsilon t\ )^{-3{,}291}(E_{AC})^{-0{,}854}$

  Metode Bina Marga 1987 :

  $N_f = 0{,}0796\ (0{,}000408\ )^{-3{,}291}(2516586{,}4)^{-0{,}854}$

  $N_f = 38.809{,}420$

  Metode AASHTO 1993 :

  $N_f = 0{,}0796\ (0{,}000322\ )^{-3{,}291}(2516586{,}4)^{-0{,}854}$

  $N_f = 84.579{,}588$

- **Model Retak *Finn et al***

  $\text{Log } N_f = 15{,}947 - 3{,}291 \log \frac{\varepsilon t}{10^{-6}} - 0{,}854 \log \frac{E}{10^3}$

  Metode Bina Marga 1987 :

  $\text{Log}N_f = 15{,}947 - 3{,}291 \log \frac{0{,}000408}{10^{-6}} - 0{,}854 \log \frac{2516586{,}4}{10^3}$

  $N_f = 28.250{,}367$

  Metode AASHTO 1993 :

  $\text{Log } N_f = 15{,}947 - 3{,}291 \log \frac{0{,}000322}{10^{-6}} - 0{,}854 \log \frac{2516586{,}4}{10^3}$

  $N_f = 61.567{,}711$

- **Model *Rutting The Asphalt Institute* (1982)**

  $Nd = 1{,}365\text{x}10^{-9}(\varepsilon c)^{-4{,}477}$

  Metode Bina Marga 1987 :

  $Nd = 1{,}365\text{x}10^{-9}(0{,}00138)^{-4{,}477}$

  $Nd = 8.707{,}51$

Metode AASHTO 1993 :

$Nd = 1{,}365x10^{-9}(0{,}00134)^{-4{,}477}$

Nd = 9.933,092

- **Model *Rutting Finn et al***

$$Nd = 1{,}077 \times 10^{18} \left(\frac{10^{-6}}{\varepsilon c}\right)^{4{,}4843}$$

Metode Bina Marga 1987 :

$$Nd = 1{,}077 \times 10^{18} \left(\frac{10^{-6}}{0{,}00138}\right)^{4{,}4843}$$

Nd = 8.954,80

Metode AASHTO 1993 :

$$Nd = 1{,}077 \times 10^{18} \left(\frac{10^{-6}}{0{,}00134}\right)^{4{,}4843}$$

Nd = 10.217,383