

Table III: Results of improvement of mix fatigue with lime addition

Deformation ϵ (μdef)	Cycle number Without lime	Cycle number With lime	Increasing due to lime %
94	1 116 892	1 362 105	21.9
126	889 741	1 082 056	21.6
215	770 134	928 145	20.5
252	502 326	602 548	19.9

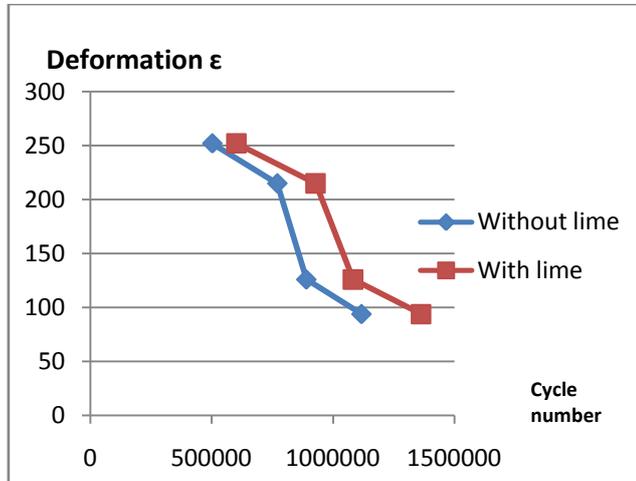


Fig.4. improvement of mix fatigue life with lime addition

The fatigue resistance is determined by calculating the deformation of the mix corresponding to life expectancy of 10^6 cycles noted ϵ_6 , and this from the equation of fatigue established by the linear regression between the various results of life expectancy and those of corresponding deformations. We note from the results, that for the same deformation, the corresponding number of cycles is more important with lime,

which proves the advantage of lime to increase the resistance of mix to fatigue, which extends the useful life of pavement by at least 20%.

V. CONCLUSION

The lime acts on the components of mix asphalt; it improves the adhesiveness of the aggregates and asphalt, which improves the mix resistance to fatigue, but it is necessary to indicate that the nature of the aggregates, as well as the characteristics of the lime, are important parameters to achieve satisfactory results, so lime avoids the damages of the road, and it increases its useful life, a thing which allows the optimization of the costs generated by maintenances.

References

- [1] J. Blazek, G. Sebor, D. Maxa, M. Ajib and H. Paniagua, "Effect of hydrated lime addition on properties of asphalt", *Petroleum and Coal*, 42(1), pp.41-45, 2000
- [2] D. N. Little, *Handbook for Stabilization of Pavement Subgrades and Base Courses with Lime*, Dubuque (Iowa, USA): Kendall/Hunt Publishing Company, 1995
- [3] H. Plancher, E. L. Green and J. C. Petersen, "Reduction of oxidative hardening of asphalts by treatment with hydrated lime – a mechanistic study", *Proc. Association Asphalt Paving Technologists* 45, pp.1-24, 1976.
- [4] C. V. Chachas, W. J. Liddle, D. E. Peterson and M. L. Wiley, *Use of hydrated lime in bituminous mixtures to decrease hardening of the asphalt cement*, Report PB 213 170, Salt Lake City (Utah, USA): Utah State Highway Department, 1971.
- [5] Johanson, Bhanthaver "rheological properties of lime treated paving asphalt aged at 60 °C in a pressure ageing vessel, *fuel science and technology int'L*, 1317-1343, 1995.