

THE CONSOLIDATION OF FOOTWALL DUST IN UNDERGROUND INTAKE HAULAGES AND TRAVELLING WAYS IN GOLD MINES

by

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INTRODUCTION

Vehicular and pedestrian traffic in mine haulages leading from downcast shafts, in which air velocities are high, raises much dust if the haulage footwalls are not adequately consolidated.

The use of water for allaying dust in haulages is not entirely satisfactory; firstly because the practice is in opposition to the need to keep the relative humidity of the air as low as possible and, secondly, because of the frequency with which water must be applied if its use is to be effective. Waste engine oil¹ which has been used for this purpose with advantage is no longer freely available as previously, and a substitute has accordingly been sought.

MULREX 925, marketed by the Mobil Oil Company has been identified as a suitable substitute for waste engine oil for allaying dust in haulages. The material is water soluble and can be applied by spraying, and is readily available.

TEST PROCEDURES

(i) **Site:** Tests were conducted in a relatively newly-developed haulage, not previously treated with oil, not currently carrying any traffic, and not being watered. The footwall was dry with a thick layer of unconsolidated fine dust and "gravel" on the footwall. The air velocity in the haulage was 4 m/s.

(ii) **Method:** The dust created by four men walking through the section of the haulage, or sweeping the footwall of the test section, was measured before and after treatment of the footwall. Long-period thermal precipitator or gravimetric sampling was precluded by the short duration of tests, and assessment of dust concentrations in the intake air to and the return air from the test section were, therefore, based on konimeter sampling.

Various concentrations of MULREX 925 solutions were applied to the footwall test sections on the areas between the locomotive tracks and the travelling way next to the tracks. The area between the tracks and the drains was not treated.

RESULTS

The results of tests covering the range of concentrations of MULREX 925 are given in the following tables.

Site No. 1

MULREX used per treatment	Water used	Concn. MULREX	Area treated (m ²)	Cost of MULREX per treatment at 32c/l	Cost/m ² per treatment
60l	600l	10% (1:10)	36 × 2,5 = 90	R19,20	21c

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TEST	KONIMETER DUST CONCNS (p/ml)					REMARKS
	Intake		Return		Dust prod. by diff.	
	No. of Samples	Ave Concn	No. of Samples	Ave Concn		
1	87	53	99	1 318	1 265	No treatment
2	52	85	57	123	38	12 days after 1st treatment
3	31	69	67	271	202	19 " " " "
4	25	113	42	144	31	38 days after 2nd treatment
5	20	64	20	72	8	46 " " " "
6	31	54	38	82	28	54 " " " "
7	30	100	34	119	19	62 " " " "
8	21	84	20	97	13	70 " " " "
9	25	54	25	187	133	78 " " " "
10	29	63	30	86	23	87 " " " "
11	45	58	46	128	70*	137 " " " "
12	40	79	40	122	43*	160 " " " "

*Footwall being swept by four workers using bristle brooms.

Site No. 2

MULREX used per treatment	Water used	Concn. MULREX	Area treated (m ²)	Cost of MULREX per treatment at 32c/l	Cost/m ² per treatment
7,5l	300l	2,5% (1:40)	15 × 2,5 = 37,5	R2,40	6,5c

TEST	KONIMETER DUST CONCNS (p/ml)					REMARKS
	Intake		Return		Dust prod. by diff.	
	No. of Samples	Ave Concn	No. of Samples	Ave Concn		
1	20	139	20	971	832	Before treatment
2	20	107	28	150	43	8 days after 1st treatment
3	30	43	37	88	45	8 days after 2nd treatment
4	21	152	20	212	60	16 " " " "
5	22	66	18	210	144	24 " " " "
6	34	74	30	226	152	30 " " " "
7	40	178	41	723	545*	54 " " " "
8	42	41	42	231	190*	88 " " " "
9	41	67	42	297	230*	110 " " " "

*Footwall being swept by four workers using bristle brooms.

Site No. 3

MULREX used per treatment	Water used	Concn. MULREX	Area treated (m ²)	Cost of MULREX per treatment at 32c/l	Cost/m ² per treatment
3,3l	198l	1,7% (1:60)	25	R1,06	4,2c

TEST	KONIMETER DUST CONCNS (p/ml)					REMARKS
	Intake		Return		Dust prod. by diff.	
	No. of Samples	Ave Concn	No. of Samples	Ave Concn		
1	30	105	39	1 224	1 119	Before treatment
2	33	40	30	202	162	34 days after 1st treatment
3	36	104	35	181	77	41 " " " "
4	40	72	40	223	151	49 " " " "
5	38	87	41	214	126	56 " " " "

COMPARISON OF COSTS

Concn. of MULREX in water	Cost/m ²
1:10 (10%)	21c
1:40 (2,5%)	6,5c
1:60 (1,6%)	4,2c

CONCLUSIONS

The effectiveness of MULREX 925 in consolidating haulage footwall dust has been demonstrated. The effectiveness of the solution is clearly dependent on the concentrations used. It is possible that the interval between applications may be extended significantly by the use of more concentrated solutions, but this possibility has not been examined.

The results given in this report should be construed as a guide to the application of MULREX 925. Mines wishing to use this material should conduct appropriate tests to ensure that application is matched to the conditions of the particular haulages concerned.

REFERENCE

1. VISSER, B.C. The use of oil for footwall consolidation in dry downcast airways. *J. Mine Vent. Soc. S. Afr.*, Vol. 16, No. 6, June, 1963, pp. 98.

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The permission of the Chamber of Mines of S.A. to publish this note is kindly acknowledged.

ERRATA

In the paper “**Note on the Inter-Action between Barometric Pressure and Methane Issuing from Fissures**” by H.M.W. Eschenburg which was published in the October, 1977 Journal there was a printing error in the last sentence. This should read.

“It is evident that the barometric pressure graph forms a mirror image of the methane level graph, that is when the barometric pressure drops, the methane level **increases** and when the barometric pressure increases, the methane levels **decrease**”.

Apologies are made for any inconvenience caused.

Editor