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MOSJØEN ALUMINIUMVERK

ICE AND SNOW ACCRETION ON PIPE CONVEYOR

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MOSJØEN ALUMINIUMVERK

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SAMMENDRAG

19 years of temperature and precipitation records from the weather stations Mosjøen - Mosal and Vardefjell are investigated with respect to the probability for supercooled precipitation and snow accretion. Significant amounts of supercooled precipitation have not occurred during the investigated period. Wet snow may occur on the average 1 - 2 times per year with precipitation rates of 5 - 10 mm/12 hours in 2/3 of the cases. The lowest measured air temperature is -31.4°C .

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MOSJØEN ALUMINIUMVERK

ICE AND SNOW ACCRETION ON PIPE CONVEYOR

1. INTRODUCTION

In a letter dated 1 August 1986 (appendix 1) The Norwegian Meteorological Institute (DNMI) was asked to evaluate the dimensioning wind speeds for a pipe conveyor for aluminiumoxide from the harbour to the top of the siloes. Under a meeting in Oslo 4 August 1986 it was concluded that an already performed wind analysis for Mosjøen (1) was sufficient. However, the question of snow and ice shedding from the up to 45 m high lattice suspension and down on the trafficated areas underneath was raised.

An investigation of the probabilities for ice and snow accretion was ordered as a co-project between DNMI and the Norwegian Research Institute of Electricity Supply A/S (EFI) (appendix 2). EFI has employed a meteorologist who is attached to DNMI in order to work with wind and ice loadings on e.g. transmitting towers and electrical transmission lines.

The analyses in this report are based on existing computer programs available at DNMI.

2. SHORT DESCRIPTION OF THE SYSTEM

The pipe conveyor is in principle similar to a conventional conveyor belt, except that the belt is formed into a cylindric pipe between the end stations. The return pipe is located just underneath and the whole system is suspended by a lattice-work construction. The conveyor system is about 830 m long and rises from about 6 m above ground in the harbour area to about 45 m above ground over the roofs of the furnace halls. The pipe conveyor and the catwalks will be enclosed by a steel pipe on the about 270 m long part above the furnace halls in order to ensure safe access in bad weather. The steel pipe has a diameter of 2.7 m and is suspended with a V-shaped lattice construction underneath.

The heating of the lattice construction and the steel pipe from the pipe conveyor is considered to be negligible.

3. PRECIPITATION ICE

3.1 Processes

Precipitation ice is a notation for ice accretion formed together with precipitation, either as glaze formed by supercooled rain or as wet snow.

3.1.1 Supercooled rain

Supercooled rain preassumes a so-called "temperature inversion", i.e. a temperature increase with height. Near the ground there must be sub-freezing temperatures and a warm, melting layer aloft. Falling snow crystals from above will then melt into raindrops in the melting layer and become supercooled in the freezing layer below. These drops will freeze immediately when hitting the

surface or objects in the air stream.

3.1.2 Snow accretion

Snow accretion can be formed in two ways, either as for supercooled rain if the melting layer is shallow and melts the snow crystals only partially, or if the surface air temperature is slightly above 0°C. In the last and most common case the partly melted snow crystals will adhere to objects in the air stream due to the free water in the crystals. If the wind speed is moderate to strong (say above 10 m/s) considerable layers of wet and heavy layers may accrete on e.g. lattice constructions. If the temperature later on drops, this layer may of course freeze and remain on the construction until the temperature again rises above freezing.

3.2 Methods

We have neither satisfying theoretical methods nor a necessary time resolution in the meteorological data to identify cases and quantify amounts of accreted ice from precipitation. We are therefore confined to qualitative methods and evaluation. The outlines of the evaluations will be the following:

Supercooled rain preassumes, as stated above, a melting layer aloft in the atmosphere. This could naturally be the case in Mosjøen which is situated in a relatively narrow valley. If a warm front with precipitation comes in from the sea after a period with cold weather, the cold and stable air may still remain in the lower part of the valley and form the freezing layer necessary for supercooled rain.

Hence, we must examine the frequency of such temperature inversions together with precipitation.

Wet snow accretion is connected with a small temperature range of probably the order 0.5 - 1°C above the freezing point. As the time resolution in our data is 6 hours, we have no possibilities to examine the precipitation rate within this range. We are limited to examine the precipitation rates in a much larger temperature interval.

A special attention is paid to the extreme precipitation amounts in the winter season.

3.3 Weather stations and data records

The weather station Mosjøen-Mosal has been in operation more or less continuously since 1958, but is now closed down. This station has continuous and complete data in DNMI's data-base for the period 1965-1983, and this 19 years period is therefore chosen for the present analyses.

A nearby station, Vardefjell, 634 masl. approx. 5 km NE of Mosjøen, is very suitable for identifying cases of temperature inversions. The period 1965-83 is also covered by Vardefjell.

3.4 Extreme precipitation rates and temperature

Table 1 shows the 10 highest daily precipitation amounts for each of the 12 months and the year. During the months October to April 60 mm or more is measured for one day (24 hours) 13 times, and the absolute maximum of 160.5 mm was measured on 20 March 1966.

An examination of the temperature-observations shows that in most of these cases the precipitation was strictly rain with temperatures of 5-8°C. Some outprints of the records are shown in table 2. (Note that the precipitation amounts in table 1 is the total amount for the period 07-07 hours.) In 3 of the 13 cases

there was a significant rise from sub-zero to above zero temperatures during the event, and an eventual wet snow accretion must have been of very short duration. See table 2 for 7 - 8 January 1971, 10 - 11 March 1965 and 22 - 23 March 1973.

Hence we may conclude that the extreme precipitation amounts during the winter season in Mosjøen is limited either to rain alone, or with a transition from snow to rain with a relative short period with mixed precipitation. Hence eventual cold air in the valley must either be drained out quickly or warmed by the rain in such cases.

3.5 Precipitation and temperature inversions

A complete analysis of temperature-inversions should include an examination of the vertical structure of the atmosphere measured at our radiosonde station at Bodø. (Vertical profiles of temperature, humidity and wind are measured twice a day by means of balloons and radio transmitters.) However, at present it is rather time consuming to combine these data with the surface data, it would for instance be necessary with special programming. As we already have the nearby station Vardefjell in a suitable height, this work was found not worthwhile.

We have already found that no significant inversion cases are connected with the extreme precipitation rates in winter. Due to the amount of data a different method is used for the moderate to small precipitation rates.

The computer program "KOMB" identifies cases where selected weather parameters are within separate limits for each of 2 or more weather stations at the same hour. In this case, the significant inversion cases should be found when the temperature criteria listed in table 3 are fulfilled for the same observation hour.

Table 3. Temperature criteria used for inversion analysis

	Mosjøen-Mosal		Vardefjell	
	Min.	Max.	Min.	Max.
Temperature at the obs. hour	-10	2	-10	10
Min. temp. for the past 12 hours	-30	-2	-10	2
Max. temp. for the past 12 hours	-10	2	0	10

The temperature criteria are defined very wide in order to let all "suspect" cases be included. Additionally, only 12 hour periods with 2 mm precipitation or more at Mosjøen-Mosal were chosen. Since 1965 only 4 cases were found, and one of these, 22 March 1973, is already discussed in section 3.4.

A further examination of the 3 remaining cases revealed that in only one case on 19 December 1967 there was definitely a melting layer aloft. At 19 hr there was measured 2.9 mm precipitation and only a part of this came as supercooled rain.

Another case, 11 December 1975, did most probably not include a melting layer as the maximum temperature at Vardefjell was only 0.1°C during the actual precipitation period. The corresponding maximum temperature in Mosjøen was -1.4 and the precipitation height for 12 hours was 21.5 mm.

We may then conclude that significant amounts of supercooled precipitation have not occurred in Mosjøen during the examined period.

3.6 Precipitation rates near 0°C

As stated earlier we have no possibility to identify exactly the cases when wet snow accretion occurs. This phenomenon is probably very sensitive to the course of the precipitation rate and temperature, but the exact connections are not established theoretically. We assume that the accretion rate is somewhat proportional to the precipitation rate. A qualitative evaluation of the probability of the accreted wet snow can therefore be given from the distribution of precipitation rates around 0°C.

The observations from Mosjøen-Mosal have been sorted as follows:

All cases with precipitation rates of 5 mm or more within the temperature range of -5 to + 5°C are counted. Altogether 539 cases were found for the period 06.1964 - 12.1983. The precipitation rates are distributed as shown in table 4.

Table 4. Distribution of precipitation rates
25mm/12 hours between -5 and +5°C.

Precip.rate (mm/12 hours)	Number of cases
5 - 10	360
10 - 15	110
15 - 20	44
20 - 25	11
25 - 30	10
30 - 35	2
35 - 40	2 (1 is 22 March 1973)

The number of cases resulting in wet snow accretion is estimated to be less than 10%. This means that the probability of "wet snow" cases are less than 3 per year, or more probably of the order 1-2 per year on the average.

It is also seen from table 4 that 2/3 of the potential cases are with precipitation between 5 and 10 mm and only 5% with more than 20 mm.

4. LOW TEMPERATURES

Table 5 shows a distribution of concurrent temperatures and wind forces in Beaufort for the years 1965-83. The values in table 5 represent the state at the observation hours. It should be noted that the lowest temperatures are not connected with calm weather, but with light to gentle breeze (force 2 and 3), or with wind speeds up to about 5 m/s.

The absolute minimum temperature is -31.4°C measured 5 February 1966. 31 December 1971 the minimum temperature was -31.3°C, as can be seen from the monthly records of averages and extremes in table 6.

5. CONCLUSIONS

- The analyses of precipitation and temperature data for the weather stations Mosjøen-Mosal and Vardefjell suggest wet snow accretion of the order 1-2 cases per year on the average. These cases are connected with precipitation rates of 5-10 mm/12 hours in 2/3 of the cases.

- Supercooled rain is not significant.
- Temperatures less than -30°C must be expected, probably down to -35°C with a return period of 50 years.

REFERENCE

- (1) Harstveit, K.: Ekstreme vindforhold ved Mosjøen Aluminiumsverk.
DNMI rapport 35/86

TABLE 1. The 10 highest daily precipitation amounts for each month and year.

DET NORSKE METEOROLOGISKE INSTITUTT
KLIMA-AVDELINGEN

7719 MOSJØEN - MOSAL
4 M.O.H OBSERVASJONS- PERIODE 06-1964 TIL 08-1985

MAKSIMALE DAGLIGE NEDBØRHØYDER I MM

JANUAR			FEBRUAR			MARS		
74.4	8.	1971	93.5	26.	1979	160.5	20.	1966
72.5	13.	1980	55.6	17.	1976	76.7	23.	1973
67.3	16.	1967	53.0	27.	1975	65.6	11.	1965
59.7	14.	1982	48.0	23.	1975	57.5	10.	1973
55.6	9.	1981	43.0	25.	1983	56.5	26.	1982
51.8	28.	1981	41.5	1.	1981	54.8	16.	1973
50.5	29.	1981	40.0	22.	1974	52.9	10.	1977
50.3	24.	1981	38.0	16.	1976	52.3	13.	1968
49.5	25.	1973	36.5	1.	1970	50.1	13.	1972
49.2	21.	1974	36.5	28.	1975	46.0	8.	1968
APRIL			M A I			J U N I		
96.8	26.	1968	48.0	14.	1979	57.3	12.	1973
60.0	15.	1967	40.6	12.	1971	45.1	29.	1964
41.8	11.	1971	37.6	15.	1979	35.4	11.	1973
40.6	28.	1967	36.3	24.	1983	34.3	28.	1965
39.0	10.	1981	36.0	16.	1979	31.5	2.	1985
35.2	17.	1982	32.7	31.	1982	25.3	5.	1976
34.9	8.	1974	32.4	3.	1966	24.7	30.	1964
34.3	30.	1966	32.2	20.	1967	23.9	17.	1964
34.2	11.	1976	31.0	30.	1978	20.1	20.	1972
33.8	6.	1969	29.3	20.	1970	20.0	7.	1983
J U L I			A U G U S T			S E P T E M B E R		
62.5	20.	1982	53.3	18.	1966	56.6	20.	1974
39.7	21.	1983	43.5	19.	1984	56.5	26.	1983
29.0	27.	1981	42.8	26.	1971	46.9	16.	1982
28.5	14.	1969	40.2	30.	1983	45.5	7.	1981
26.6	6.	1971	40.0	23.	1984	43.5	19.	1974
26.2	27.	1964	39.5	11.	1983	40.5	28.	1975
26.0	9.	1984	33.0	13.	1982	40.1	2.	1972
24.9	3.	1975	32.0	25.	1980	38.5	23.	1975
24.5	12.	1980	31.8	28.	1983	36.8	22.	1965
24.5	26.	1964	29.0	8.	1973	35.3	7.	1976
O K T O B E R			N O V E M B E R			D E S E M B E R		
66.0	22.	1983	66.0	2.	1984	52.5	28.	1973
64.2	6.	1971	60.1	10.	1964	47.2	16.	1972
56.3	25.	1971	59.1	28.	1968	46.0	2.	1983
51.7	12.	1971	57.6	3.	1971	45.6	4.	1968
50.0	7.	1981	52.8	11.	1971	43.8	6.	1979
49.9	17.	1972	50.2	9.	1973	43.5	31.	1972
49.5	31.	1966	48.2	25.	1983	41.2	6.	1968
48.0	17.	1984	45.0	11.	1964	41.0	3.	1981
47.0	30.	1983	43.0	10.	1978	40.7	21.	1975
46.4	31.	1983	42.5	22.	1978	40.5	30.	1973
ARSOVERSIKT								
160.5	20/03	1966	64.2	6/10	1971	56.5	26/03	1982
96.8	26/04	1968	62.5	20/07	1982	56.5	26/09	1983
93.5	26/02	1979	60.1	10/11	1964	56.3	25/10	1971
76.7	23/03	1973	60.0	15/04	1967	55.6	17/02	1976
74.4	8/01	1971	59.7	14/01	1982	55.6	9/01	1981
72.5	13/01	1980	59.1	28/11	1968	54.8	16/03	1973
67.3	16/01	1967	57.6	3/11	1971	53.3	18/08	1966
66.0	22/10	1983	57.5	10/03	1973	53.0	27/02	1975
66.0	2/11	1984	57.3	12/06	1973	52.9	10/03	1977
65.6	11/03	1965	56.6	20/09	1974	52.8	11/11	1971

TABLE 2. WEATHER OBSERVATIONS FOR SPECIFIC
DAYS FROM THE WEATHER STATION
MOSJØEN - MOSAL

Significant symbols:

- DT - Date
- KL - Local hour
- TTTT - Air temperature (actual)
- TN - Minimum temperature for the last 12 hours
- TX - Maximum temperature for the last 12 hours
- UUU - Relative humidity
- DD - Wind direction in degrees/10
- F - Wind force (Beaufort scale)
- RRRRR - Precipitation amount (mm) for the last 12 hours
- SSS - Snow depth (cm)
- N - Cloud amount (scale 0 - 8)
- VV - Visibility (special code)
- V1-V7 - Symbols for present (V1-V3) and past (V4-V7) weather
The most important are:
 - S - snow
 - R - rain
 - RL - mixed rain/snow
 - SO - sunshine
 - SB - snow shower
 - RB - rain shower
 - LB - rain/snow shower
 - RL - clean air
- BX - Maximum wind force since previous observation

MOSJØEN - MOSAL

FEBRUAR

1979

BREDDE 65 51 LENGDE 13 12 HS

5

L	POPOPO	PPPPPP	A	PPPP	TTTTT	TN/TG	TX/TW	UUU	S	DD	FF	F	RRRRR	E	SSS	N	H	VV	V1	V2	V3	WW	V4	V5	V6	V7	W	W	FX	FG	NCCC	NCHS	BX	SD	
1					0.1			80	33		3				8	93	S						S						0	0	0			4	
7					0.8 - 3.0	1.8		88	15		2	5.6	87	8	93	SB							SB						0	0	0			3	4
3					3.2			76	15		2				6	97							SB						0	0	0			3	
9					2.0	0.0	3.7	83	13		3	1.5			8	97							YR						0	0	0			3	
1					5.5			82	15		3				8	96	R						R						0	0	0			3	
7					5.6	1.0	6.0	79	10		4	26.0	70	8	96	R							R						0	0	0			4	4
3					6.4			82	30		5				8	95	R						R						0	0	0			6	
9					3.3	3.3	7.0	97	15		5	45.0			8	96	R						R						0	0	0			5	
1					4.5			83	15		4				8	95	R						R						0	0	0			5	
7					4.2	3.2	5.8	87	12		5	48.5	50	8	95	R							R						0	0	0			6	4
3					3.6			83	30		5				8	96	R						RB	R					0	0	0			6	
9					1.0	1.0	6.0	79	33		3	20.0			8	96	RB						RB						0	0	0			5	
1					1.7			89	33		3				8	95	LB						LB						0	0	0			4	
7					0.2 - 0.3	2.7		97	32		3	8.1	56	8	93	SB							SB						0	0	0			5	4
3					0.8			89	13		1				8	97							SB						0	0	0			4	
9					-1.0 - 1.0	1.0		93	00		0	0.1			8	97													0	0	0			1	

719 MOSJØEN - MOSAL

MARS

1966

BREDDE 65 51 LENGDE 13 12 HS

3

L	POPOPO	PPPPPP	A	PPPP	TTTTT	TN/TG	TX/TW	UUU	S	DD	FF	F	RRRRR	E	SSS	N	H	VV	V1	V2	V3	WW	V4	V5	V6	V7	W	W	FX	FG	NCCC	NCHS	BX	SD		
1					-11.3			99	14		1				2	99	RL						RL						0	0	0			3		
7					-10.2 - 12.2	- 1.0		99	14		2				21	7	99	RL					SO							0	0	0			2	4
3					- 2.6			99	15		1				5	99	RL						SB							0	0	0			2	
9					- 1.0 - 10.8	1.0		99	15		1	2.5			8	99	RL						SB							0	0	0			2	
1					- 0.5			96	14		3				8	99	RL						RL							0	0	0			3	
7					0.1 - 1.5	0.4		99	12		3	7.5	10	9	94	SF							SF	RB					0	0	0			3	4	
3					5.9			97	12		3				9	94	R						R							0	0	0			4	
9					8.0	0.1	8.2	95	12		3	105.0			9	93	R						R						0	0	0			4		
1					6.0			95	13		4				8	93	R						R							0	0	0			4	
7					5.5	5.0	8.1	97	03		3	55.5	0	8	94	R							R						0	0	0			4	3	
3					3.9			82	30		3				7	97	RL						RB							0	0	0			4	
9					2.7	1.5	5.9	85	36		3	0.0			8	96	LB						RL	SO					0	0	0			4		

9 MOSJØEN - MOSAL

MARS

1973

BREDDE 65 51 LENGDE 13 12 HS

3

L	POPOPO	PPPPPP	A	PPPP	TTTTT	TN/TG	TX/TW	UUU	S	DD	FF	F	RRRRR	E	SSS	N	H	VV	V1	V2	V3	WW	V4	V5	V6	V7	W	W	FX	FG	NCCC	NCHS	BX	SD		
1					- 1.3			77	31		5				8	96							SB						0	0	0			6		
7					- 2.5 - 4.0	0.1		80	33		3	3.0	13	8	95	S							S							0	0	0			5	4
3					2.0			80	33		4				8	93	S						S							0	0	0			4	
9					- 1.6 - 3.8	2.0		77	33		4	4.2			8	93	SF						SF							0	0	0			5	
1					- 2.7			63	33		3				8	97														0	0	0			5	
7					- 3.6 - 3.9 - 1.5			80	33		1	0.5	13	7	98								SB							0	0	0			4	4
3					- 1.5			68	12		2				8	97														0	0	0			3	
9					- 2.2 - 4.0 - 0.7			98	00		0	3.5			8	94	S						S							0	0	0			2	
1					- 2.6			97	33		1				8	93	S						SB							0	0	0			1	
7					- 1.0 - 3.0 - 1.0			98	00		0	35.3	32	8	93	R							S						0	0	0			1	4	
3					7.0			75	14		4				8	94	R						R							0	0	0			4	
9					7.4 - 3.3	8.0		73	09		4	38.0			8	94	R						R							0	0	0			5	
1					5.5			83	15		4				8	94	R						R							0	0	0			5	
7					9.2	3.8	9.2	71	15		5	38.7	0	8	95	R							R							0	0	0			6	3
3					6.9			60	21		4				3	99	R						R							0	0	0			6	
9					5.9	5.5	9.2	73	33		4	16.5			8	96	R						R							0	0	0			4	
1					7.4			68	12		4				8	94	R						RB							0	0	0			5	
7					8.0	4.8	8.5	75	18		5	7.4	0	8	95	R							R							0	0	0			6	1
3					10.7			50	12		4				3	99	R						RB							0	0	0			5	

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TABLE 5. ABSOLUTE FREQUENCY OF CONCURRENT WIND FORCE AND AIR TEMPERATURE
 Symbols: T=air temperature in degrees Celsius Observations at 00 06 12 and 18 GMT
 F=wind force in Beaufort

MOSJØEN - MOSAL		Year 1965-1984												Total number of observations:26876.
T/F	0	1	2	3	4	5	6	7	8	9	10	11	12	SUM
30	0	1	0	2	0	0	0	0	0	0	0	0	0	3
29	0	1	1	2	0	0	0	0	0	0	0	0	0	4
28	1	2	4	2	1	0	0	0	0	0	0	0	0	10
27	1	3	4	2	0	0	0	0	0	0	0	0	0	10
26	2	4	9	4	3	0	0	0	0	0	0	0	0	22
25	1	7	12	7	3	0	0	0	0	0	0	0	0	30
24	2	14	8	8	1	0	0	0	0	0	0	0	0	33
23	0	21	20	10	2	0	0	0	0	0	0	0	0	53
22	2	22	33	22	5	0	0	0	0	0	0	0	0	84
21	3	29	45	34	6	0	0	0	0	0	0	0	0	117
20	8	42	41	30	7	1	0	0	0	0	0	0	0	129
19	15	56	61	28	12	2	0	0	0	0	0	0	0	174
18	31	64	85	36	10	1	0	0	0	0	0	0	0	227
17	24	73	94	52	6	1	0	0	0	0	0	0	0	250
16	42	107	130	63	21	3	0	0	0	0	0	0	0	366
15	58	174	168	96	30	4	3	0	0	0	0	0	0	533
14	81	197	211	144	42	8	0	0	0	0	0	0	0	683
13	127	273	267	179	38	13	1	0	0	0	0	0	0	898
12	138	289	325	218	76	18	3	1	0	0	0	0	0	1068
11	171	335	310	228	109	18	5	1	0	0	0	0	0	1177
10	142	308	326	269	116	30	7	2	0	0	0	0	0	1200
9	132	312	333	220	111	27	6	3	0	0	0	0	0	1144
8	128	288	326	257	137	30	21	10	2	0	0	0	0	1199
7	103	255	292	280	162	47	11	3	1	0	0	0	0	1154
6	93	276	320	276	173	48	14	2	0	0	0	0	0	1202
5	110	312	355	312	164	43	21	5	1	0	0	0	0	1323
4	114	254	310	309	191	45	10	2	0	0	0	0	0	1235
3	148	240	344	314	164	40	7	5	0	0	0	0	0	1262
2	139	314	321	269	169	51	15	4	1	0	0	0	0	1283
1	156	309	364	277	173	42	23	3	1	0	0	0	0	1348
0	120	244	306	239	134	42	18	0	0	0	0	0	0	1103
-1	103	204	303	196	105	33	5	1	0	0	0	0	0	950
-2	81	220	235	186	94	23	8	0	0	0	0	0	0	847
-3	53	177	229	147	70	8	4	0	0	0	0	0	0	688
-4	47	146	170	121	66	13	3	1	0	0	0	0	0	567
-5	44	141	183	102	57	8	0	1	0	0	0	0	0	536
-6	33	112	158	90	37	6	0	0	0	0	0	0	0	436
-7	31	103	162	77	32	6	1	1	0	0	0	0	0	413
-8	30	99	149	64	25	2	0	4	0	0	0	0	0	373
-9	20	87	131	52	19	1	1	0	0	0	0	0	0	311
-10	18	92	123	60	17	5	0	0	0	0	0	0	0	315
-11	13	90	119	44	6	1	1	0	0	0	0	0	0	274
-12	13	67	116	48	8	2	0	0	0	0	0	0	0	254
-13	8	63	114	38	7	1	0	0	0	0	0	0	0	231
-14	8	59	109	43	7	0	0	0	0	0	0	0	0	226
-15	15	45	111	34	6	0	1	0	0	0	0	0	0	212
-16	5	54	97	36	4	1	0	0	0	0	0	0	0	197
-17	2	37	68	23	2	0	0	0	0	0	0	0	0	132
-18	2	37	70	28	2	0	0	0	0	0	0	0	0	139
-19	6	22	62	30	2	0	0	0	0	0	0	0	0	122
-20	1	30	41	18	2	0	0	0	0	0	0	0	0	92
-21	2	19	37	16	1	0	0	0	0	0	0	0	0	75
-22	1	17	28	11	0	0	0	0	0	0	0	0	0	57
-23	0	10	23	14	0	0	0	0	0	0	0	0	0	47
-24	0	3	8	9	0	0	0	0	0	0	0	0	0	20
-25	0	5	10	5	0	0	0	0	0	0	0	0	0	20
-26	0	2	3	2	0	0	0	0	0	0	0	0	0	7
-27	0	1	3	1	0	0	0	0	0	0	0	0	0	5
-28	0	0	1	1	0	0	0	0	0	0	0	0	0	2
-29	0	0	1	1	0	0	0	0	0	0	0	0	0	2
-30	0	0	1	0	0	0	0	0	0	0	0	0	0	1
-31	0	0	1	0	0	0	0	0	0	0	0	0	0	1
SUM	2628	6768	8291	5686	2635	624	189	49	6	0	0	0	0	26876

TABLE 6. MONTHLY AVERAGES AND EXTREMES OF TEMPERATURE
FOR MOSJØEN - MOSAL 1965 - 82

Symbols:

- TM - Monthly mean temperature
- AV - Departure from the normal periode 1931 - 60
- TN - Monthly mean of the minimum temperature
- TX - Monthly mean of the maximum temperature
- TMIN - Absolute minimum temperature for the month
- TMAX - Absolute maximum temperature for the month
- DT - Date

STNR STNAVN

MANEDS- OG ARSMIDLER AV LUFTTEMPERATUR

JAN FEB MAR APR MAI JUN JUL AUG SEP OKT NOV DES AR

7719 MOSJØEN - MOSAL

Kommune:

3 n.o.h.

1965

TM	- 6.3	- 2.7	- 1.8	4.3	6.2	11.8	11.7	11.6	11.2	6.3	- 5.0	- 9.8	3.1
AV	- 1.1	1.8	0.3	1.7	- 1.3	0.6	- 3.1	- 1.9	2.2	1.8	- 5.2	- 6.9	- 0.9
TN	- 9.8	- 5.8	- 5.0	0.3	1.1	7.8	8.1	8.0	7.9	4.0	- 7.9	- 12.6	
TX	- 2.4	1.2	1.2	7.7	10.2	16.1	15.1	15.4	14.8	8.9	- 1.8	- 6.5	
TMIN	-19.6	-23.7	-16.9	- 8.0	- 5.8	2.5	2.5	2.0	3.5	- 3.4	-20.1	-23.0	-23.7
DT	20	28	6	8	1	21	12	6	28	11	22	12	28.02
TMAX	6.3	9.0	6.7	14.3	15.2	24.1	23.5	20.4	22.5	12.0	11.2	0.5	24.1
DT	15	6	16	24	4	7	22	28	3	5*	5	5*	7.06

7719 MOSJØEN - MOSAL

Kommune:

3 n.o.h.

1966

TM	- 9.8	-14.5	- 3.0	0.1	6.2	13.7	13.0	12.0	6.9	3.5	0.2	- 2.2	2.2
AV	- 4.6	-10.0	- 0.9	- 2.5	- 1.3	2.5	- 1.8	- 1.5	- 2.1	- 1.0	0.0	0.7	- 1.9
TN	-13.9	-18.3	- 6.1	- 3.4	2.6	9.1	10.0	8.7	4.5	1.4	- 1.9	- 4.8	
TX	- 6.1	-10.6	0.5	3.7	9.8	18.0	16.1	15.3	9.8	5.9	3.1	0.2	
TMIN	-25.5	-31.4	-18.6	-11.8	- 4.0	2.5	5.4	0.5	- 1.1	- 5.6	- 8.0	-13.0	-31.4
DT	3	5	1	12	6	8*	8	25	11	26	21	27	5.02
TMAX	2.4	- 4.4	8.2	14.0	16.0	27.6	25.0	22.4	17.6	9.9	7.6	6.5	27.6
DT	16	26	19	28	14*	18	26	4	5	8	3	3	18.06

7719 MOSJØEN - MOSAL

Kommune:

3 n.o.h.

1967

TM	- 8.7	- 0.7	1.2	2.0	7.9	10.4	12.5	13.2	10.7	3.9	3.2	- 9.9	3.8
AV	- 3.5	3.8	3.3	- 0.6	0.4	- 0.8	- 2.3	- 0.3	1.7	- 0.6	3.0	- 7.0	- 0.2
TN	-12.7	- 3.4	- 1.1	- 1.4	2.9	7.4	9.4	9.9	7.4	1.7	1.3	-13.1	
TX	- 4.3	1.6	3.9	5.2	11.9	13.4	16.2	16.8	14.3	6.7	5.6	- 5.7	
TMIN	-24.3	-13.0	- 8.1	-10.1	- 6.8	2.5	3.9	2.9	0.7	- 7.8	- 2.0	-21.8	-24.3
DT	30	1	3	20	1	12	17	7	24	21	3	21	30.01
TMAX	8.1	7.5	8.0	9.6	22.4	22.8	25.0	26.4	18.5	11.8	8.4	8.1	26.4
DT	16	11	5*	12	30	1	8*	3	6	1	21	1	3.08

7719 MOSJØEN - MOSAL

Kommune:

3 n.o.h.

1968

TM	- 7.9	- 5.7	- 0.6	2.9	5.8	11.1	12.1	11.2	9.0	0.9	- 3.6	0.5	3.0
AV	- 2.7	- 1.2	1.5	0.3	- 1.7	- 0.1	- 2.7	- 2.3	0.0	- 3.6	- 3.8	3.4	- 1.1
TN	-11.8	- 9.5	- 4.0	- 0.1	1.2	7.8	8.5	7.8	5.1	- 1.6	- 6.1	- 1.9	
TX	- 4.0	- 2.1	2.7	5.8	9.5	14.8	15.1	14.6	12.9	4.0	- 0.4	2.7	
TMIN	-26.1	-20.4	-14.4	- 7.0	- 4.4	2.2	2.2	2.3	- 4.8	-14.5	-20.4	-15.8	-26.1
DT	12	5	20	7	4	11	11	15	26	31	2	29	12.01
TMAX	9.0	8.4	8.1	11.7	17.1	25.0	22.6	22.4	25.5	12.3	7.5	9.2	25.5
DT	20	29	27	30	29	24	16	22	6	1	27*	3*	6.09

7719 MOSJØEN - MOSAL

Kommune:

3 n.o.h.

1969

TM	- 6.4	- 7.8	- 3.2	3.3	6.9	13.4	13.7	16.5	8.2	5.7	- 5.1	- 5.4	3.3
AV	- 1.2	- 3.3	- 1.1	0.7	- 0.6	2.2	- 1.1	3.0	- 0.8	1.2	- 5.3	- 2.5	- 0.7
TN	- 9.4	-10.9	- 7.1	- 0.8	1.5	9.2	10.3	11.7	5.0	2.9	- 7.9	- 8.6	
TX	- 3.8	- 4.3	0.9	6.9	11.4	17.0	17.1	21.4	11.3	8.3	- 2.2	- 2.3	
TMIN	-24.6	-21.9	-15.8	-10.7	- 3.8	- 0.2	5.0	6.0	- 0.6	- 3.1	-22.0	-22.6	-24.6
DT	13	17	19	1	3	5	26	21*	14	23	25	21	13.01
TMAX	4.4	7.7	6.0	13.3	18.1	28.0	25.2	28.5	17.0	14.5	5.5	8.6	28.5
DT	4*	6	6	25	27	20	17	2	10	18	9*	9	2.08

STNR STNAVN

MÅNEDS- OG ARSMIDLER AV LUFTTEMPERATUR

	JAN	FEB	MAR	APR	MAI	JUN	JUL	AUG	SEP	OKT	NOV	DES	AR	
7719 MOSJØEN - MOSAL	Kommune:												3 m.o.h.	1970
TM	-10.2	-10.7	-1.0	0.9	8.1	13.7	14.1	13.6	8.5	4.3	-4.0	-0.9	3.0	
AV	-5.0	-6.2	1.1	-1.7	0.6	2.5	-0.7	0.1	-0.5	-0.2	-4.2	2.0	-1.0	
TN	-14.3	-14.0	-3.9	-2.4	3.1	9.1	10.9	9.7	5.6	2.0	-7.5	-4.1		
TX	-7.0	-6.6	1.9	4.2	12.1	18.3	17.7	17.3	11.9	7.0	-0.5	2.0		
TMIN	-24.0	-22.1	-12.7	-13.0	-1.6	5.0	5.3	3.2	-2.5	-14.1	-22.0	-23.0	-24.0	
DT	17	10	22	3	16	18	25	27	26	31	11	31	17.01	
TMAX	4.7	5.3	6.2	8.3	18.6	27.8	26.4	25.5	15.8	13.0	8.3	9.2	27.8	
DT	31	1	25	18	29	7	1	2	1	2	20	19	7.06	
7719 MOSJØEN - MOSAL	Kommune:												3 m.o.h.	1971
TM	-2.3	-3.8	-5.6	1.8	8.1	11.9	12.7	12.6	8.3	4.3	-3.5	1.4	3.8	
AV	2.9	0.7	-3.5	-0.8	0.6	0.7	-2.1	-0.9	-0.7	-0.2	-3.7	4.3	-0.2	
TN	-5.7	-7.5	-9.6	-1.7	4.0	8.6	9.1	9.8	5.2	1.6	-6.7	-1.6		
TX	0.7	-0.4	-1.3	5.3	11.4	15.3	16.2	16.0	11.4	6.7	0.1	4.2		
TMIN	-19.4	-26.7	-19.4	-8.6	-1.1	0.3	4.0	4.3	-1.0	-5.6	-22.2	-11.6	-26.7	
DT	1	26	15	4	15	10	29	23	29	15	23	19*	26.02	
TMAX	11.7	7.8	6.8	8.6	26.8	23.7	28.5	24.1	19.3	12.5	11.2	10.1	28.5	
DT	10	4	30	20	31	1	5	1	9	6	3	25	5.07	
7719 MOSJØEN - MOSAL	Kommune:												3 m.o.h.	1972
TM	-5.4	-3.0	-0.2	3.0	8.3	14.6	15.7	12.9	7.7	4.6	0.0	3.2	5.1	
AV	-0.2	1.5	1.9	0.4	0.8	3.4	0.9	-0.6	-1.3	0.1	-0.2	6.1	1.1	
TN	-7.7	-6.2	-3.4	-0.3	3.2	9.2	11.9	9.5	5.2	2.1	-2.7	1.0		
TX	-3.1	-0.2	3.1	6.0	12.5	20.1	19.5	16.5	10.8	7.2	3.0	5.5		
TMIN	-15.4	-14.3	-13.0	-9.1	-1.1	4.1	5.0	2.5	-0.2	-7.4	-11.0	-5.0	-15.4	
DT	18	10	26	1	13	2	27	30	16	22	21	9	18.01	
TMAX	7.2	7.5	9.8	10.5	18.2	31.1	31.0	26.0	16.0	13.0	8.5	10.2	31.1	
DT	1	24	19	13	18	30	1	1	7	2*	27	30*	30.06	
7719 MOSJØEN - MOSAL	Kommune:												3 m.o.h.	1973
TM	1.0	-3.8	2.2	1.5	7.7	11.5	15.1	10.9	7.1	1.1	-4.3	-5.7	3.7	
AV	6.2	0.7	4.3	-1.1	0.2	0.3	0.3	-2.6	-1.9	-3.4	-4.5	-2.8	-0.4	
TN	-1.6	-7.4	-1.0	-1.9	3.5	7.5	11.6	8.6	3.9	-1.8	-8.3	-9.8		
TX	3.6	-0.3	5.3	4.5	11.2	15.1	19.1	13.5	10.7	3.8	-0.2	-2.0		
TMIN	-10.0	-17.0	-7.9	-8.6	-1.5	2.3	7.0	4.0	-1.7	-17.0	-20.3	-21.2	-21.2	
DT	23*	25*	2	5	5	3	6	26	14	23	29	8	8.12	
TMAX	11.5	5.7	11.7	8.3	22.5	27.0	30.0	25.5	17.5	12.6	9.8	8.6	30.0	
DT	1	5	24	22	31	20	7	17	1	3	9	27	7.07	
7719 MOSJØEN - MOSAL	Kommune:												3 m.o.h.	1974
TM	-0.1	-2.0	-0.8	3.5	8.3	13.1	13.2	13.0	10.0	2.6	-2.8	-2.3	4.6	
AV	5.1	2.5	1.3	0.9	0.8	1.9	-1.6	-0.5	1.0	-1.9	-3.0	0.6	0.6	
TN	-3.1	-5.3	-5.0	0.3	2.4	7.6	10.0	9.4	6.4	0.1	-5.5	-5.8		
TX	2.9	1.1	3.0	6.4	12.9	17.6	16.4	16.5	13.9	5.1	-0.5	0.6		
TMIN	-9.5	-15.5	-16.0	-12.2	-3.5	0.0	5.8	4.0	2.0	-7.7	-11.8	-20.2	-20.2	
DT	5	6	17	11	5	1	26	29	21	31	24	30	30.12	
TMAX	8.5	9.0	9.5	10.7	19.8	29.8	21.2	23.0	23.0	11.2	6.4	8.0	29.8	
DT	21	22	31	2	19	17	10	27	2	7	10	25	17.06	

	JAN	FEB	MAR	APR	MAI	JUN	JUL	AUG	SEP	OKT	NOV	DES	AR	
7719 MOSJØEN - MOSAL	Kommune:												3 m.o.h.	1975
TM	- 2.4	1.2	0.9	1.7	6.9	8.8	11.7	12.5	8.8	5.5	1.3	- 1.5	4.6	
AV	2.8	5.7	3.0	- 0.9	- 0.6	- 2.4	- 3.1	- 1.0	- 0.2	1.0	1.1	1.4	0.6	
TN	- 5.8	- 1.9	- 2.4	- 2.6	3.1	5.3	9.1	9.4	6.2	2.6	- 1.4	- 5.3		
TX	1.3	3.9	3.7	5.6	10.3	11.9	15.1	15.7	11.8	8.5	4.0	2.3		
TMIN	-20.8	-20.4	- 8.8	- 8.6	- 2.0	- 0.5	3.3	5.2	1.1	- 5.5	-12.5	-12.0	-20.8	
DT	11	14	17	4	29	4	8	26	25	31	20	26	11.01	
TMAX	9.5	9.5	6.9	12.5	20.0	17.4	21.7	23.7	16.8	17.1	11.5	8.5	23.7	
DT	2	4	21	20	10	19	30	9	10	1	9	11	9.08	
7719 MOSJØEN - MOSAL	Kommune:												3 m.o.h.	1976
TM	- 7.5	- 0.5	- 3.5	1.4	8.1	10.8	13.0	11.9	5.0	3.9	0.1	- 8.0	2.9	
AV	- 2.3	4.0	- 1.4	- 1.2	0.6	- 0.4	- 1.8	- 1.6	- 4.0	- 0.6	- 0.1	- 5.1	- 1.2	
TN	-11.7	- 3.4	- 7.3	- 2.2	2.7	6.1	8.9	8.3	1.3	1.7	- 2.8	-11.5		
TX	- 3.2	2.1	0.6	4.5	12.4	14.8	16.9	15.4	9.5	6.1	2.9	- 4.6		
TMIN	-25.0	- 9.5	-18.0	-10.3	- 4.3	0.5	2.5	2.5	- 4.2	- 3.2	-15.0	-26.8	-26.8	
DT	15	8	15	4	1	2*	31	4	30	3	25	27	27.12	
TMAX	4.5	8.0	9.1	8.8	21.0	23.0	26.2	22.5	13.4	12.4	9.6	5.0	26.2	
DT	31	17	5	12	19*	13	16	13	17	5	20	5	16.07	
7719 MOSJØEN - MOSAL	Kommune:												3 m.o.h.	1977
TM	- 8.3	-10.5	0.2	0.1	5.3	9.5	13.3	13.0	7.7	6.0	- 1.4	- 0.3	2.9	
AV	- 3.1	- 6.0	2.3	- 2.5	- 2.2	- 1.7	- 1.5	- 0.5	- 1.3	1.5	- 1.6	2.6	- 1.2	
TN	-11.9	-14.5	- 2.9	- 3.5	1.4	6.4	9.2	8.4	5.0	3.0	- 3.9	- 2.9		
TX	- 4.8	- 6.7	3.3	3.7	8.3	12.9	17.1	17.8	10.6	8.4	1.2	2.5		
TMIN	-20.3	-24.0	-15.8	-14.5	- 2.7	- 0.4	1.5	2.5	0.5	- 5.0	-19.4	-13.0	-24.0	
DT	31	12	29	8	12	6	14	25	10	3	24	30	12.02	
TMAX	9.0	2.9	8.7	10.3	13.9	22.2	29.0	26.2	16.4	13.5	13.4	8.3	29.0	
DT	5	28	10	30	5	13	7	3	2*	31	1	15	7.07	
7719 MOSJØEN - MOSAL	Kommune:												3 m.o.h.	1978
TM	- 6.2	-10.4	- 2.4	1.1	7.0	12.5	15.2	12.8	7.5	3.9	0.6	-13.0	2.4	
AV	- 1.0	- 5.9	- 0.3	- 1.5	- 0.5	1.3	0.4	- 0.7	- 1.5	- 0.6	0.4	-10.1	- 1.7	
TN	-10.5	-14.1	- 5.8	- 2.8	1.8	8.2	10.2	8.8	3.9	0.7	- 2.3	-16.6		
TX	- 2.5	- 6.6	1.2	4.7	10.9	16.6	19.9	16.8	11.3	7.0	3.9	- 8.6		
TMIN	-24.0	-26.8	-21.0	-10.1	- 5.0	2.5	3.5	- 0.4	- 5.3	- 5.5	-16.7	-31.3	-31.3	
DT	27	15	17	3	6	14	18	14	29	31	30	31	31.12	
TMAX	9.0	7.4	7.0	12.0	21.0	25.8	27.4	24.8	19.3	15.5	12.1	5.3	27.4	
DT	7	27	30	21	23	23	31	21	5	12	12	19	31.07	
7719 MOSJØEN - MOSAL	Kommune:												5 m.o.h.	1979
TM	- 9.2	- 5.8	- 1.6	1.9	6.5	11.9	13.8	13.5	7.7	2.8	- 0.8	- 3.8	3.1	
AV	- 4.0	- 1.3	0.5	- 0.7	- 1.0	0.7	- 1.0	0.0	- 1.3	- 1.7	- 1.0	- 0.9	- 1.0	
TN	-12.2	-10.1	- 5.1	- 1.8	2.5	8.2	10.5	9.7	5.1	0.5	- 3.4	- 7.3		
TX	- 6.3	- 2.0	1.5	5.5	10.3	16.6	17.8	17.5	10.7	5.6	1.8	- 0.2		
TMIN	-24.5	-26.0	-20.3	- 9.6	- 5.5	3.8	4.9	4.6	0.3	- 4.8	-12.5	-18.5	-26.0	
DT	28	14	17	15	1	1	29	6	3	27*	16	11	14.02	
TMAX	4.3	7.0	6.8	10.8	15.6	27.7	26.1	25.5	19.5	9.7	8.2	7.6	27.7	
DT	7	25	3	25	30	22	9	18	7	9	22	2*	22.06	

	JAN	FEB	MAR	APR	MAI	JUN	JUL	AUG	SEP	OKT	NOV	DES	AR	
7719 MOSJØEN - MOSAL	Kommune:												5 m.o.h.	1980
TM	- 8.7	- 5.6	- 3.2	3.9	7.3	14.2	16.5	14.6	9.7	1.6	- 4.8	- 8.6	3.1	
AV	- 3.5	- 1.1	- 1.1	1.3	- 0.2	3.0	1.7	1.1	0.7	- 2.9	- 5.0	- 5.7	- 1.0	
TN	-11.6	- 9.4	- 7.0	0.7	3.0	9.6	11.1	10.7	6.7	- 1.0	- 8.5	-12.6		
TX	- 4.7	- 2.0	0.9	7.1	11.1	18.4	21.4	18.6	13.0	4.4	- 0.8	- 4.4		
TMIN	-21.2	-26.0	-16.0	- 5.3	- 0.5	1.4	5.3	2.0	- 0.3	-14.0	-23.2	-25.8	-26.0	
DT	31	9	4	1	3	13	23	31*	21	30	28	15	9.02	
TMAX	7.7	7.2	5.4	12.2	21.4	27.4	31.4	26.6	16.5	12.5	8.9	6.0	31.4	
DT	13	24	6	27	30	17	30	16	17	8	6	1	30.07	

	JAN	FEB	MAR	APR	MAI	JUN	JUL	AUG	SEP	OKT	NOV	DES	AR	
7719 MOSJØEN - MOSAL	Kommune:												5 m.o.h.	1981
TM	- 6.0	- 3.8	- 6.1	2.2	9.2	8.8	12.7	11.6	9.4	3.7	- 3.9	-12.8	2.1	
AV	- 0.8	0.7	- 4.0	- 0.4	1.7	- 2.4	- 2.1	- 1.9	0.4	- 0.8	- 4.1	- 9.9	- 2.0	
TN	-10.4	- 7.1	-10.2	- 0.6	3.1	5.6	9.9	8.3	5.4	1.0	- 7.2	-16.2		
TX	- 2.0	- 0.6	- 1.7	5.1	14.5	12.1	16.6	15.0	13.3	6.1	- 0.4	- 9.0		
TMIN	-27.5	-18.0	-22.3	- 7.5	- 6.3	- 0.4	5.6	1.5	- 0.5	- 6.2	-17.4	-24.0	-27.5	
DT	7	13	5	23	3	7	25	28	17	27	27	27*	7.01	
TMAX	9.2	7.5	8.0	9.6	23.3	19.3	28.8	20.8	17.1	14.4	6.8	9.0	28.8	
DT	24	1	31	12	23	30	10	9	19	1	10	3	10.07	

	JAN	FEB	MAR	APR	MAI	JUN	JUL	AUG	SEP	OKT	NOV	DES	AR	
7719 MOSJØEN - MOSAL	Kommune:												4 m.o.h.	1982
TM	- 7.8	0.7	1.2	2.9	7.0	9.4	13.3	12.8	8.1	4.9	- 0.9	- 1.6	4.2	
AV	- 2.6	5.2	3.3	0.3	- 0.5	- 1.8	- 1.5	- 0.7	- 0.9	0.4	- 1.1	1.3	0.1	
TN	-11.1	- 2.4	- 2.0	0.1	3.0	5.1	10.1	8.6	4.8	2.4	- 3.6	- 4.6		
TX	- 3.8	3.2	3.9	5.9	10.3	13.1	16.5	17.0	11.2	7.7	2.3	1.3		
TMIN	-25.0	-15.5	-12.5	- 7.4	- 1.8	0.5	3.5	3.7	- 2.2	- 5.5	-14.5	-16.1	-25.0	
DT	7	1	3	12	4*	14	8	30	25	17	29	13	7.01	
TMAX	7.7	8.1	9.2	9.4	15.1	25.0	29.2	21.5	16.0	14.0	8.8	8.3	29.2	
DT	20	14	25	21	24	30	16	16*	28	1*	10	3*	16.07	

MOSAL ALUMINIUM
MOSJØEN ALUMINIUMVERK
Postboks 348
8651 MOSJØEN

Det Norske Metreologisk Institutt
Klimaavdelingen
v/avd.sjef Bjørn Aune
Blindern
0361 OSLO 3

3224
01.08.1986

RØRTRANSPORTANLEGG FOR ALUMINIUMOKSYD

Ved Mosjøen Aluminiumverk ser en nå på mulighetene for å bygge et nytt transportanlegg for aluminiumoksyd fra våre havnesiloer til silo C.

Transportanlegget er av en ny konstruksjon, lukket rørtransport, men som i hovedprinsippet har mye til felles med tradisjonelle transportbånd når det gjelder understøttelse, fagverksoppbygging osv.


På grunn av at avlastning til siloene ved elektrolysehallene må skje på silotopp kreves det temmelig høye understøttelseskonstruksjoner for dette "transportbåndet".

Systemet markedsføres av firmaet "Simmering - Graz-Pauker AG" Wien - norsk agent er Saxlund A/S, Risør v/hr. Markussen.

Vedlagt følger brev fra SGP samt tegninger som viser oppbyggingen av det nye transportanlegget som vi vennligst ber Dem vurdere m.h.t. vindbelastninger.

I denne forbindelse refereres det til telefonsamtale med en av Deres medarbeidere 3. juli d.å. Ønsker De ytterligere informasjoner ber jeg Dem vennligst kontakte P. Kjensli, Mosjøen Aluminiumverk eller undertegnede når jeg er tilbake fra ferie i uke 33.

Med hilsen
Mosjøen Aluminiumverk
Effektivisering Transport/lager



T. F. Saue
prosjektleder

c.c. P. Kjensli, Mosjøen Aluminiumverk
I. Eng, Multiconsult A/S, Oslo
J.I. Markussen, Saxlund A/S, Risør


Mosal Aluminium
Mosjøen Aluminiumverk

EFI - Sintef-Gruppen
 Sem Særlandsvei 11
 7034 TRONDHEIM - NTH

P. O. Box 348
 8651 Mosjøen
 Norway

Tel.: Mosjøen (087) 70 111
 Telex: 55051 Alumo N
 Cable: Mosalverk Mosjøen
 Telefax: (087) 71 887

Bestilling

Nr. 134 789 /3810 2030	Antall sider
	Leverandør nr.

Dette bestillingsnr. bes vennligst påført ordrebekreftelse, forsendelsespapirer og faktura in triplo. Øvrige instruksjoner - Se baksiden av denne bestilling.

Vår ref. TK/RHa

8651 Mosjøen, 13.08.86.

eres ref.

henhold til avtale med S. Fikke samt telefon 13.08.86 Fikke/P. Kjensli.

bestiller vi herved nedenfor spesifiserte varer. Vedlagte gjenpart av denne bestilling tjener som ordrebekreftelse og skal returnert til oss forsynt med Deres underskrift.

M.nr.	Kvantum	Varebetegnelse	Pris
		Mosjøen Aluminiumverk Materialadministrasjon Transport- og Lagereffektiviseringsprosjekt Utarbeide rapport over is-snøforhold i Mosjøen (avtale med T.F. Saue). Temperaturforhold veksling kuldevarmegrad samt ekstrem kulde over en periode.	kr 8 000,-

forsendelse (Pakkseddel sendes sammen med varene)

Bil Båt Jernbane Fly Post

Sum

kr 8 000,-

Betalingsbetingelser

pr. 30 dager Kalendermnd. + 30 dager 10 dager Kontantrab. 2 %

Leveringstid (dato)

Uke 34

Prisen er:

Fast Reguleres etter avtale

Merverdiavgift

inklusiv eksklusiv

Leveringsbetingelser og- sted (iflg. Incoterms 1953)

Godkjent utført

med FOB og C&F leveranser dekkes forsikring av vår generalpolise

Emballasje

inklusiv eksklusiv

Materiale og arb.

garanteres uten feil i mnd. i normal drift

dog. begrenset til

mnd. etter levering

Ekvirent:

P. Kjensli

Innkjøper

Trygve Kværnø

Spørsmål og anmerkninger om denne bestilling rettes til vår innkjøpsavd.

for **Mosal Aluminium**

Elkem a/s & Co.

Mosjøen Aluminiumverk

Dagen bekreftet dato

Firmastempel

Underskrift