ECONOMICAL ADVANTAGES OF THE USE OF THE PROGRAMS FOR "COMPUTER PROGRAMS FOR STEEL WIRE ROPES CALCULATIONS"

While developed firstly with the aim of solve the technical problems connected with the stability, behaviour, durability and fatigue endurance, during the study we saw that, in our factory at least, the quantity of wire used for the construction of the ropes differed from the standards. Once, it was superior and others it was inferior.

In order to know exactly the problem, we took a part of the fabrication whose cost price was representative of the majority, and we make a simulation of that we can obtain if we adopted the corresponding measures.

The results are shown in this paper. We could save 210 tm. of wire in a fabrication of 4260. tm. This represented a saving of 11020 US$ by year n this brand of the fabrication. The numbers were made originally in pesetas, and they have been converted later to the currency in that times. In any case, the ratio between the cost of the wire used and saved, is actually the same.

Once seen that we could obtain substantial advantages, we selected a complete brand of our products in order to test practically what happened in the work of the ropes. The result fulfilled our expectancy.

By this reason we took the decision of to including in the programs the possibility of calculating the ropes with the condition that, remaining in the lower zone of the diameter and weight by unit length , they fulfilled with enough security the breaking load required. This is made automatically (if this manner is selected by the user), as can be seen in the Demonstration CD, in the chapter of Seale ropes. The standards used for this comparison are ISO 2408 and DIN 3051 / 3088.
In the following tables.

The meaning of the different captions are:

Table I- No special explanation.
Weight ISO (A).-Weight required by ISO 2408
Weight NMQ (B).-The corresponding to our own standards.
Wire saving,%.- Difference between both (positive when the weight ISO is inferior to NMQ)
Saved Wire.- The preceding coefficient applied to the productions indicated in the table II
Wire consumption.-The wire used for the indicated production with our standards.
Wire cost price.- The internal price cost for the average diameter., expressed in U$ $
Saving US $ / year. Total cost of the saved wire in table III.

TABLE I CONSIDERED PRODUCTION , T/YEAR					
Average rope diameter	4.00	8.00	16.00	32.00	64.00
	Production	Production	Production	Production	Production
Rope construction	t/year	t/year	t/year	t/year	t/year
STANDARD					
6x7+1	26.90	33.0	18.0		
6x12+1		19.5	57.0		
6x19+1	2.70	218.6	676.0	309.00	
6x37+1		15.0	273.0	321.00	43.00
6x61+1					59.00
6x24+7			173.0	295.00	
SEALE					
6x17+1			97.0		
6x19+1		56.0	543.0	561.00	
8x19+1			89.0		
WARRINGTON					
6x12+1			197.0		
WARRING-SEALE					
6x36+1			20.0	29.00	
6x36(4x7+5)			20.0		
6x36(7x7)				13.00	
RELLENO					
6x25+1			26.0	8.00	
NON ROTATING					
18x7+1		66.0			
SUBTOTAL	29.6	408.1	2189.0	1536.0	102.0
SUM TOTAL					4264.7

TABLE II WEIGTH PER UNIT LENGTH COMPARISON , KG/M							TABLE II WEIGTH PER UNIT LENGTH COMPARISON , KG/M								
Average rope diam	4.00			8.00			16.00			32.00			64.00		
	Weigth	Weigth	DIFEREN.	Weigth	Weigth	DIFEREN.	Weigth	Weigth	DIFEREN.	Weigth	Weigth	DIFEREN.	Weigth	Weigth	DIFEREN.
Rope constructic	ISO [A]	NMQ [B]	%	ISO [A]	NMQ [B]	%	ISO [A]	NMQ [B]	%	ISO [A]	NMQ [B]	%	ISO [A]	NMQ [B]	%
STANDARD	kg/m	kg/m		kg/m	kg/m		kg/m	kg/m		kg/m	kg/m		kg/m	kg/m	
6x7+1	0.054	0.064	15.625	0.218	0.229	4.803	0.870	0.917	5.125						
6x12+1				No existe	0.224		No existe	0.888							
6x19+1	0.055	0.057	3.509	0.221	0.210	-5.238	0.883	0.927	4.746	3 533	3 709	4.745			
6x37+1		.		0.221	0.224	1.339	0.886	0.923	4.009	3 543	3 684	3.827	14.172	14.73	3.788
6x61+1															
6x24+7							0.814	0.800	-1.750	3 256	3 374	3.497			
SEALE															
6x17+1							0.901	1.000	9.900						
6x19+1				0.225	0.245	8.163	0.901	1.050	14.190	3 604	3 889	7.328			
8x19+1							0.888	0.860	-3.256						
WARRINGTON															
6x12+1															
WARRING-SEALE															
6x36+1							0.901	0.933	3.430	3 604	4 033	10.637			
6x36(4x7+5)							1 019	1 069	4.677						
6x36(7x7)										4 076	4 409	7.553			
RELLENO															
6x25+1							0.901	1.014	11.144	3 604	4 036	10.704			
NON ROTATING															
18x7+1				0.250	0.238	-5.042									

TABLE III – SAVED WIRE, KGS.															
Average rope diameter	4.00			8.00			16.00			32.00			64.00		
	Wire saving %	Production t año	Wire consumpt saving kg /year	Wire saving %	Production t año	Wire consumpt saving kg /year	Wire saving %	Production t año	Wire consumpt saving kg /year	Wire saving %	Production t año	Wire consumpt saving kg /year	Wire saving %	Production t año	Wire consumpt saving kg /year
Rope construction															
STANDARD															
6x7+1	15.625	26.90	4203	4.803	33.0	1585	5.125	18.0	923						
6x12+1					19.5			57.0							
6x19+1	3.509	2.70	95	-5.238	218.6	-11450	4.746	676.0	32086	4.75	309.00	14663			
6x37+1				1.339	15.0	201	4.009	273.0	10944	3.83	321.00	12286	3.788	43.00	1629
6x61+1															
6x24+7							-1.750	173.0	-3027	3.50	295.00	10317			
SEALE															
6x17+1							9.900	97.0	9603						
6x19+1				8.163	56.0	4571	14.190	543.0	77054	7.33	561.00	41112			
8x19+1							-3.256	89.0	-2898						
WARRINGTON															
6x12+1								197.0							
WARRING-SEALE															
6x36+1							3.430	20.0	686	10.64	29.00	3085			
6x36(4x7+5)							4.677	20.0	935						
6x36(7x7)										7.55	13.00	982			
RELLENO															
6x25+1							11.144	26.0	2897	10.70	8.00	856			
NON ROTATING															
18x7+1				-5.042	66.0	-3328									
SUBTOTAL			4298			-8421			129203			83301			1629
SUM TOTAL															210010

TABLE IV SAVING IN US$									TABLE IV SAVING IN US$													
Average rope diameter	4				8				16				32				64					
	Wire consuump. saving	Wire average diameter	Wire cost price	Saving US $/year	Wire consuump. saving	Wire average diameter	Wire cost price	Saving US $/year	Wire consuump. saving	Wire average diameter	Wire cost price	Saving US $/year	Wire consuump. saving	Wire average diameter	Wire cost price	Saving US $/year	Wire consuump. saving	Wire average diameter	Wire cost price	Saving US $/year
Rope construction	kg /año		US $/kg.		kg/year		US $/kg.		kg/year		US $/kg.		kg/year		US $/kg.		kg/year		US $/kg.	
STANDARD																				
6x7+1	4203.1	0.45	1.2	4859	1585.2	0.85	0.67	1057	922.6	1.70	0.49	451								
6x12+1											0.00	0								
6x19+1	94.7	0.30	1.4	128	-11450.5	0.50	0.98	-11176	32086.3	1.05	0.58	18759	14662.7	2.10	0.5	7129				
6x37+1					200.9	0.37	1.35	272	10943.7	0.75	0.65	7061	12285.8	1.50	0.53	6453	1628.9	3.00	0.40	656
6x61+1																				
6x24+7									-3027.5	0.85	0.67	-2019	10317.1	1.75	0.49	5035				
SEALE																				
6x17+1									9603.0	1.40	0.53	5130								
6x19+1					4571.4	0.65	0.72	3285	77054.3	1.20	0.57	44031	41112.1	2.60	0.48	19692				
8x19+1									-2897.7	1.05	0.58	-1694								
WARRINGTON																				
6x12+1																				
WARRING-SEALE																				
6x36+1									686.0	0.90	0.65	445	3084.8	1.85	0.49	1504				
6x36(4x7+5)									935.5	0.90	0.65	606								
6x36(7x7)													981.9	1.85	0.49	479				
RELLENO															0.00	0				
6x25+1									2897.4	1.05	0.58	1694	856.3	2.10	0.49	416				
NON ROTATING																				
18x7+1					-3327.7	0.55	0.89	-2962												
SUBTOTAL				4987				-9524				74464				40707				656
SUM TOTAL																				111290