

## Table Water Carriers

by Rudolf Volz

Up No.	The Up Number represents the specific level of the total pyramid counted from the bottom to the top (1 - 210).
Down No.	The Down Number represents specific the level of the step pyramid counted backwards from the bottom to the top (209 - 1). $Up\_No. = 210 - Down\_No.$
Delivery lanes	The blocks were transported on the delivery lanes up to the corresponding level. This quantity is the key factor that determines the production capacity of the entire project. The capacity is limited by the total number of lanes and the number of workers. Since the way back was a separate lane, the following condition must hold: $Delivery\_lanes \leq Total\_lanes - 1$
Max. rate	The maximal rate represents the number of produced and installed blocks per day for 3 months during the Nile flood. Each lane can deliver 15 blocks per hour, or 180 blocks per day. $Maximal\_rate = Delivery\_lanes * 180$ Then the numbers <code>Delivery_lanes</code> and <code>Maximal_rate</code> have to be reduced so that the corresponding number <code>Workers_maximum</code> does not exceed 20,000.

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The towing team with sliding sledges also consists of 18 workers, what is the same number as using wooden rollers. The two workers with the clay jars receive 5 liters of water from the water carriers every 4 minutes. They have to lubricate the wooden beams at the position of the sledges to reduce friction. The two workers with the wooden bars are responsible for braking and direction control, not for levering.

Workers tow	<p>Number of workers during the Nile flood who towed the blocks on the ramps up to the corresponding level. This is calculated as follows:</p> $W_1 = 2 * \text{Delivery\_lanes} * (3 + 0.5 * \text{Up\_No.} + \text{Down\_No.}/44) * 1.2 * 18$ <p>On each lane, the tow teams were spaced 11 block lengths apart what is indicated by the orange lines. This corresponds to 2 levels and therefore, the number of tow teams can be expressed by <math>0.5 * \text{Up\_No.}</math>. At the bottom of the pyramid, 3 towing teams were waiting to be deployed.</p> <p>Statistically, on the top level of the pyramid there were <math>\text{Down\_No.}/44</math> teams to transport their block to the designated location. The factor 1.2 expresses the additional proportion of workers on the way back what corresponds to <math>20/120 \triangleq 17\%</math>.</p> <p>Each tow team consisted of 18 workers.</p> <p>The factor 2 stands for the two shifts in one day.</p>
Workers quarries	<p>Workers which worked in the quarries during the Nile flood. They had to produce, smooth, store and install blocks. Also, they had to transport the blocks next to but not onto the pyramid.</p> <p>Each block required 6 days of work.</p> $W_2 = 6 * \text{Maximal\_rate}$ <p>Due to the large number of blocks, the number of stored blocks had to be kept small and therefore, the production had to be just-in-time.</p>
Water carriers	<p>Number of workers during the Nile flood who carried water to all the tow teams.</p> $N = 3 + 0.5 * \text{Up\_No.} + \text{Down\_No.}/44$ <p>N represents the number of tow teams on a single lane. All teams had to be permanently supplied with water.</p> <p>The number of water carriers can be expressed as follows:</p> $W_3 = \text{Delivery\_lanes} * 1.8 * 1.1 * 0.13 * (1 + 2 + 3 + \dots + N)$ $= \text{Delivery\_lanes} * 1.8 * 1.1 * 0.13 * N * (N + 1) / 2$ <p>The factor 0.13 expresses that the water carriers moved at about eight times the speed of the tow teams.</p> <p>They carried 20 liters of water.</p> <p>The basic idea of this term is that the tow team at position k permanently must be supplied with water.</p> <p>Each team receives 20 liters of water in 4 minutes during which the team moves by 12 m.</p> <p>Therefore <math>0.13 * k</math> water carriers have to be equally distributed on the lane.</p> <p>The factor 1.1 expresses an additional proportion of water carriers needed to bring the water next to the pyramid. This corresponds to <math>10/110 \triangleq 9\%</math>.</p> <p>The factor 1.8 indicates that an additional proportion of water carriers were on the way back. This corresponds to <math>80/180 \triangleq 44\%</math>.</p>

Workers others Workers which neither towed blocks, nor worked in the quarries, nor did carry water during the Nile flood.

$$W_4 = * 1.2 * 1.2 * 0.42 * (W_1 + W_2)$$

$$= * 0.565 * (W_1 + W_2)$$

This term represents the additional workers to build ramps. The factor 0.42 expresses the additional number of workers for building ramps when using wooden rollers without water carriers.

The water carriers were additional workers and moved at different speed towards the tow teams. Therefore, each lane of the ramp had to be wider by 20 % or 66 cm. This is expressed by the factor 1.2.

The term  $1.2 * 1.2 = 1.44$  states that the volume of the ramp grows quadratically with its width and therefore, the number of workers must grow in the same proportion.

$$W_5 = 0.15 * (W_1 + W_2 + W_3 + W_4)$$

This term refers to the extra workers who prepared food and organized things. The factor 0.15 corresponds to  $15/115 \cong 13\%$  of all employees.

Workers maximum Total number of workers during the Nile flood.

$$W_6 = W_1 + W_2 + W_3 + W_4 + W_5$$

$$= (W_1 + W_2 + W_3 + W_4) + 0.15 * (W_1 + W_2 + W_3 + W_4)$$

$$= 1.15 * (W_1 + W_2 + W_3 + W_4)$$

$$= 1.15 * (W_1 + W_2) + 1.15 * W_3 + 1.15 * 0.565 * (W_1 + W_2)$$

$$= 1.15 * 1.565 * (W_1 + W_2) + 1.15 * W_3$$

$$= \mathbf{1.8 * (W_1 + W_2) + 1.15 * W_3}$$

Constr. years The construction years represent the time required to construct the corresponding level. Each year consisted of 300 working days. The rest were Saint days.

Work years The working years represent the total working time required to build the corresponding level.

Up No.	Down No.	Delivery lanes	Max. rate	Workers tow	Workers quarries	Water carriers	Workers others	Workers maximum	Constr. years	Work years
1	209	7.45	1,341	2,655	8,046	73	9,059	19,833	0.174	2,153
2	208	7.35	1,323	2,771	7,938	80	9,067	19,856	0.174	2,164
3	207	7.25	1,305	2,883	7,830	88	9,071	19,872	0.175	2,175
4	206	7.10	1,278	2,970	7,668	95	9,008	19,741	0.177	2,185
5	205	7.09	1,276	3,112	7,657	103	9,121	19,993	0.176	2,195
6	204	6.93	1,247	3,184	7,484	110	9,037	19,816	0.178	2,204
7	203	6.88	1,238	3,303	7,430	119	9,093	19,946	0.177	2,212
8	202	6.80	1,224	3,405	7,344	128	9,108	19,984	0.178	2,221
9	201	6.70	1,206	3,493	7,236	136	9,092	19,957	0.179	2,229
10	200	6.60	1,188	3,577	7,128	144	9,073	19,922	0.180	2,236

Table Water Carriers /4

Up No.	Down No.	Delivery lanes	Max. rate	Workers tow	Workers quarries	Water carriers	Workers others	Workers maximum	Constr. years	Work years
11	199	6.50	1,170	3,657	7,020	153	9,050	19,880	0.181	2,243
12	198	6.40	1,152	3,732	6,912	161	9,024	19,830	0.182	2,249
13	197	6.30	1,134	3,804	6,804	170	8,995	19,773	0.183	2,256
14	196	6.25	1,125	3,903	6,750	180	9,034	19,866	0.182	2,261
15	195	6.20	1,116	3,999	6,696	190	9,072	19,957	0.182	2,267
16	194	6.12	1,102	4,074	6,610	199	9,063	19,946	0.182	2,271
17	193	6.05	1,089	4,152	6,534	209	9,067	19,962	0.182	2,276
18	192	5.95	1,071	4,206	6,426	218	9,022	19,872	0.184	2,280
19	191	5.90	1,062	4,292	6,372	228	9,051	19,944	0.183	2,284
20	190	5.80	1,044	4,339	6,264	237	9,001	19,841	0.184	2,287
21	189	5.75	1,035	4,420	6,210	248	9,025	19,903	0.184	2,290
22	188	5.67	1,021	4,476	6,124	257	9,001	19,857	0.185	2,292
23	187	5.62	1,012	4,552	6,070	268	9,021	19,911	0.184	2,294
24	186	5.54	997	4,602	5,983	277	8,991	19,853	0.185	2,296
25	185	5.42	976	4,614	5,854	285	8,893	19,645	0.187	2,297
26	184	5.42	976	4,725	5,854	298	8,990	19,867	0.185	2,298
27	183	5.30	954	4,730	5,724	305	8,885	19,644	0.187	2,299
28	182	5.25	945	4,794	5,670	316	8,895	19,675	0.187	2,299
29	181	5.20	936	4,855	5,616	327	8,903	19,701	0.187	2,299
30	180	5.15	927	4,915	5,562	338	8,909	19,724	0.186	2,298
31	179	5.07	913	4,943	5,476	347	8,861	19,627	0.187	2,297
32	178	5.02	904	4,998	5,422	358	8,863	19,641	0.187	2,296
33	177	4.95	891	5,030	5,346	367	8,828	19,572	0.188	2,294
34	176	4.91	884	5,091	5,303	379	8,845	19,617	0.187	2,292
35	175	4.85	873	5,128	5,238	389	8,823	19,579	0.187	2,289
36	174	4.80	864	5,175	5,184	400	8,818	19,577	0.187	2,287
37	173	4.72	850	5,186	5,098	408	8,756	19,448	0.188	2,284
38	172	4.68	842	5,238	5,054	420	8,766	19,478	0.187	2,280
39	171	4.67	841	5,323	5,044	434	8,831	19,632	0.186	2,276
40	170	4.66	839	5,408	5,033	449	8,895	19,785	0.184	2,272
41	169	4.62	832	5,457	4,990	461	8,902	19,809	0.183	2,268
42	168	4.58	824	5,504	4,946	473	8,907	19,830	0.183	2,263
43	(50%)	4.53	815	5,537	4,892	483	8,891	19,804	0.182	2,258
44	166	4.48	806	5,569	4,838	494	8,873	19,774	0.182	2,252
45	165	4.44	799	5,610	4,795	506	8,874	19,785	0.182	2,247
46	164	4.39	790	5,638	4,741	516	8,853	19,748	0.182	2,241
47	163	4.32	778	5,637	4,666	524	8,790	19,616	0.182	2,234
48	162	4.30	774	5,699	4,644	538	8,826	19,708	0.181	2,227
49	161	4.27	769	5,748	4,612	551	8,842	19,752	0.180	2,220
50	160	4.25	765	5,808	4,590	565	8,877	19,840	0.178	2,213
51	159	4.23	761	5,868	4,568	579	8,911	19,927	0.177	2,205
52	158	4.17	751	5,871	4,504	588	8,860	19,822	0.177	2,198
53	157	4.14	745	5,914	4,471	600	8,871	19,857	0.176	2,189
54	156	4.10	738	5,942	4,428	611	8,859	19,840	0.176	2,181
55	155	4.05	729	5,953	4,374	621	8,825	19,772	0.176	2,172
56	154	4.01	722	5,977	4,331	632	8,810	19,749	0.175	2,163
57	153	3.98	716	6,014	4,298	645	8,816	19,773	0.174	2,154
58	152	3.95	711	6,050	4,266	657	8,821	19,794	0.173	2,144
59	151	3.91	704	6,069	4,223	668	8,802	19,762	0.173	2,134
60	150	3.88	698	6,103	4,190	680	8,805	19,778	0.172	2,124

Table Water Carriers /5

Up No.	Down No.	Delivery lanes	Max. rate	Workers tow	Workers quarries	Water carriers	Workers others	Workers maximum	Constr. years	Work years
61	149	3.84	691	6,119	4,147	691	8,784	19,741	0.171	2,114
62	148	3.80	684	6,134	4,104	701	8,761	19,700	0.171	2,103
63	147	3.78	680	6,179	4,082	715	8,784	19,760	0.169	2,092
64	146	3.72	670	6,158	4,018	721	8,712	19,609	0.170	2,081
65	145	3.70	666	6,201	3,996	735	8,732	19,664	0.168	2,069
66	144	3.68	662	6,243	3,974	749	8,752	19,719	0.167	2,058
67	143	3.64	655	6,251	3,931	759	8,723	19,663	0.166	2,046
68	142	3.61	650	6,274	3,899	771	8,716	19,659	0.165	2,034
69	141	3.58	644	6,295	3,866	782	8,709	19,653	0.165	2,021
70	140	3.56	641	6,333	3,845	796	8,725	19,699	0.163	2,008
71	139	3.54	637	6,371	3,823	810	8,741	19,744	0.162	1,996
72	138	3.52	634	6,407	3,802	823	8,755	19,788	0.160	1,983
73	137	3.50	630	6,443	3,780	837	8,769	19,830	0.159	1,969
74	136	3.46	623	6,441	3,737	846	8,732	19,756	0.158	1,956
75	135	3.42	616	6,437	3,694	855	8,694	19,679	0.158	1,942
76	134	3.40	612	6,469	3,672	868	8,705	19,715	0.156	1,928
77	133	3.36	605	6,463	3,629	876	8,664	19,632	0.156	1,914
78	132	3.35	603	6,512	3,618	892	8,699	19,722	0.154	1,900
79	131	3.32	598	6,523	3,586	903	8,682	19,693	0.153	1,885
80	130	3.29	592	6,531	3,553	914	8,664	19,662	0.152	1,870
81	129	3.26	587	6,539	3,521	924	8,644	19,628	0.151	1,855
82	128	3.23	581	6,546	3,488	934	8,624	19,592	0.150	1,840
83	127	3.20	576	6,551	3,456	944	8,603	19,553	0.149	1,825
84	126	3.19	574	6,596	3,445	960	8,634	19,635	0.147	1,810
85	125	3.19	574	6,662	3,445	979	8,693	19,779	0.145	1,794
86	124	3.15	567	6,643	3,402	986	8,641	19,672	0.145	1,778
87	123	3.12	562	6,644	3,370	996	8,616	19,626	0.144	1,762
88	122	3.10	558	6,666	3,348	1,008	8,618	19,640	0.142	1,746
89	121	3.08	554	6,686	3,326	1,021	8,619	19,652	0.141	1,730
90	120	3.05	549	6,684	3,294	1,030	8,591	19,599	0.140	1,714
91	119	3.03	545	6,702	3,272	1,042	8,590	19,608	0.138	1,697
92	118	3.00	540	6,698	3,240	1,051	8,560	19,550	0.138	1,680
93	117	2.99	538	6,737	3,229	1,067	8,587	19,620	0.136	1,663
94	116	2.98	536	6,776	3,218	1,083	8,613	19,690	0.134	1,646
95	115	2.97	535	6,815	3,208	1,099	8,639	19,760	0.132	1,629
96	114	2.96	533	6,853	3,197	1,115	8,664	19,828	0.130	1,612
97	113	2.90	522	6,774	3,132	1,111	8,542	19,559	0.130	1,595
98	112	2.88	518	6,786	3,110	1,123	8,536	19,556	0.129	1,577
99	111	2.86	515	6,798	3,089	1,135	8,530	19,551	0.128	1,560
100	110	2.84	511	6,809	3,067	1,146	8,523	19,545	0.126	1,542
101	109	2.82	508	6,819	3,046	1,158	8,515	19,537	0.125	1,524
102	108	2.80	504	6,829	3,024	1,169	8,506	19,528	0.123	1,506
103	107	2.79	502	6,862	3,013	1,184	8,527	19,587	0.122	1,488
104	106	2.78	500	6,895	3,002	1,200	8,548	19,645	0.120	1,470
105	(Median)	2.78	500	6,952	3,002	1,220	8,600	19,773	0.118	1,452
106	104	2.75	495	6,934	2,970	1,226	8,558	19,687	0.117	1,434
107	103	2.75	495	6,990	2,970	1,246	8,609	19,815	0.114	1,416
108	102	2.73	491	6,996	2,948	1,257	8,597	19,798	0.113	1,397
109	101	2.72	490	7,026	2,938	1,273	8,615	19,852	0.111	1,379
110	100	2.70	486	7,030	2,916	1,283	8,602	19,832	0.110	1,360

Table Water Carriers /6

Up No.	Down No.	Delivery lanes	Max. rate	Workers tow	Workers quarries	Water carriers	Workers others	Workers maximum	Constr. years	Work years
111	99	2.68	482	7,033	2,894	1,294	8,588	19,810	0.108	1,342
112	(90%)	2.67	481	7,062	2,884	1,309	8,606	19,861	0.107	1,323
113	97	2.65	477	7,064	2,862	1,320	8,591	19,836	0.105	1,304
114	96	2.63	473	7,065	2,840	1,330	8,575	19,810	0.104	1,285
115	95	2.60	468	7,038	2,808	1,335	8,525	19,706	0.103	1,267
116	94	2.58	464	7,037	2,786	1,345	8,508	19,675	0.101	1,248
117	93	2.56	461	7,035	2,765	1,354	8,489	19,643	0.100	1,229
118	92	2.55	459	7,060	2,754	1,369	8,504	19,687	0.098	1,210
119	91	2.55	459	7,113	2,754	1,389	8,551	19,807	0.096	1,191
120	90	2.53	455	7,109	2,732	1,399	8,531	19,772	0.095	1,172
121	89	2.52	454	7,133	2,722	1,414	8,544	19,813	0.093	1,153
122	88	2.50	450	7,128	2,700	1,423	8,523	19,774	0.092	1,134
123	87	2.49	448	7,151	2,689	1,438	8,536	19,813	0.090	1,115
124	86	2.47	445	7,144	2,668	1,446	8,513	19,771	0.089	1,096
125	85	2.46	443	7,166	2,657	1,461	8,525	19,808	0.087	1,077
126	84	2.43	437	7,129	2,624	1,463	8,466	19,683	0.086	1,058
127	83	2.42	436	7,149	2,614	1,478	8,476	19,717	0.084	1,039
128	82	2.41	434	7,170	2,603	1,492	8,487	19,751	0.083	1,020
129	81	2.40	432	7,189	2,592	1,507	8,496	19,784	0.081	1,002
130	80	2.39	430	7,209	2,581	1,521	8,506	19,816	0.079	983
131	79	2.38	428	7,227	2,570	1,535	8,515	19,848	0.078	964
132	78	2.35	423	7,185	2,538	1,536	8,451	19,710	0.077	945
133	77	2.34	421	7,203	2,527	1,550	8,459	19,739	0.075	926
134	76	2.33	419	7,220	2,516	1,564	8,467	19,767	0.073	907
135	75	2.31	416	7,205	2,495	1,571	8,437	19,709	0.072	889
136	74	2.30	414	7,222	2,484	1,585	8,444	19,735	0.071	870
137	73	2.29	412	7,237	2,473	1,599	8,450	19,760	0.069	852
138	72	2.28	410	7,253	2,462	1,613	8,456	19,784	0.067	833
139	71	2.26	407	7,236	2,441	1,619	8,425	19,721	0.066	815
140	70	2.25	405	7,250	2,430	1,633	8,430	19,743	0.065	796
141	69	2.23	401	7,232	2,408	1,639	8,397	19,676	0.063	778
142	68	2.22	400	7,245	2,398	1,652	8,401	19,696	0.062	760
143	67	2.21	398	7,258	2,387	1,665	8,405	19,715	0.060	742
144	66	2.20	396	7,271	2,376	1,679	8,408	19,733	0.059	724
145	65	2.19	394	7,283	2,365	1,692	8,411	19,751	0.057	706
146	64	2.18	392	7,294	2,354	1,705	8,414	19,768	0.056	688
147	63	2.16	389	7,272	2,333	1,710	8,378	19,692	0.054	670
148	62	2.15	387	7,283	2,322	1,723	8,379	19,707	0.053	652
149	61	2.13	383	7,259	2,300	1,728	8,342	19,628	0.052	635
150	60	2.11	380	7,234	2,279	1,732	8,303	19,548	0.051	618
151	59	2.10	378	7,243	2,268	1,744	8,304	19,559	0.049	600
152	58	2.09	376	7,252	2,257	1,757	8,304	19,569	0.048	583
153	57	2.08	374	7,260	2,246	1,769	8,303	19,579	0.046	566
154	56	2.07	373	7,268	2,236	1,781	8,302	19,587	0.045	550
155	55	2.06	371	7,275	2,225	1,794	8,301	19,595	0.044	533
156	54	2.05	369	7,282	2,214	1,806	8,300	19,602	0.042	516
157	53	2.04	367	7,289	2,203	1,818	8,298	19,607	0.041	500
158	52	2.03	365	7,295	2,192	1,829	8,296	19,613	0.039	484
159	51	2.02	364	7,300	2,182	1,841	8,293	19,617	0.038	468
160	50	2.00	360	7,269	2,160	1,844	8,249	19,522	0.037	452

Table Water Carriers /7

Up No.	Down No.	Delivery lanes	Max. rate	Workers tow	Workers quarries	Water carriers	Workers others	Workers maximum	Constr. years	Work years
161	49	1.99	358	7,274	2,149	1,855	8,246	19,524	0.036	436
162	48	1.97	355	7,242	2,128	1,857	8,200	19,427	0.035	421
163	47	1.95	351	7,208	2,106	1,859	8,154	19,328	0.034	405
164	(99%)	1.94	349	7,211	2,095	1,870	8,149	19,326	0.032	390
165	45	1.93	347	7,214	2,084	1,881	8,144	19,323	0.031	375
166	44	1.93	347	7,254	2,084	1,902	8,181	19,421	0.030	361
167	43	1.83	329	6,916	1,976	1,823	7,792	18,507	0.030	346
168	42	1.82	328	6,915	1,966	1,833	7,784	18,497	0.029	332
169	41	1.81	326	6,915	1,955	1,842	7,776	18,487	0.028	318
170	40	1.80	324	6,914	1,944	1,852	7,767	18,476	0.026	304
171	39	1.78	320	6,873	1,922	1,851	7,715	18,361	0.025	291
172	38	1.78	320	6,910	1,922	1,871	7,749	18,452	0.024	277
173	37	1.78	320	6,947	1,922	1,890	7,783	18,542	0.023	264
174	36	1.78	320	6,984	1,922	1,910	7,817	18,633	0.022	251
175	35	1.76	317	6,941	1,901	1,909	7,763	18,513	0.021	239
176	34	1.75	315	6,938	1,890	1,918	7,752	18,497	0.020	226
177	33	1.74	313	6,934	1,879	1,926	7,741	18,481	0.019	214
178	32	1.73	311	6,930	1,868	1,935	7,730	18,463	0.018	202
179	31	1.72	310	6,925	1,858	1,944	7,718	18,445	0.017	191
180	30	1.71	308	6,920	1,847	1,952	7,706	18,425	0.016	180
181	29	1.69	304	6,874	1,825	1,949	7,648	18,296	0.015	169
182	28	1.69	304	6,909	1,825	1,969	7,680	18,383	0.014	158
183	27	1.69	304	6,944	1,825	1,988	7,713	18,470	0.013	148
184	26	1.68	302	6,938	1,814	1,996	7,699	18,448	0.012	137
185	25	1.67	301	6,931	1,804	2,004	7,686	18,424	0.011	128
186	24	1.67	301	6,965	1,804	2,024	7,718	18,511	0.010	118
187	23	1.66	299	6,958	1,793	2,032	7,703	18,486	0.010	109
188	(99,9%)	1.65	297	6,950	1,782	2,039	7,689	18,460	0.010	100
189	21	1	180	4,233	1,080	1,248	4,679	11,240	0.012	92
190	20	1	180	4,253	1,080	1,260	4,698	11,292	0.010	84
191	19	1	120	4,274	720	1,272	4,413	10,680	0.011	107
192	18	1	100	4,294	600	1,285	4,331	10,510	0.011	114
193	17	1	90	4,315	540	1,297	4,300	10,452	0.011	112
194	16	1	80	4,336	480	1,309	4,268	10,393	0.012	111
195	15	1	80	4,356	480	1,322	4,287	10,446	0.011	98
196	14	1	60	4,377	360	1,334	4,205	10,276	0.012	112
197	13	1	50	4,398	300	1,347	4,174	10,218	0.013	115
198	12	1	40	4,418	240	1,359	4,142	10,160	0.015	122
199	11	1	35	4,439	210	1,372	4,136	10,157	0.015	117
200	10	1	30	4,459	180	1,385	4,130	10,155	0.014	113
201	9	1	25	4,480	150	1,397	4,124	10,152	0.013	110
202	8	1	20	4,501	120	1,410	4,118	10,149	0.012	108
203	7	1	16	4,521	96	1,423	4,117	10,158	0.011	104
204	6	1	12	4,542	72	1,436	4,117	10,167	0.010	102
205	5	1	10	4,563	60	1,449	4,126	10,197	0.008	85
206	4	1	12	4,583	72	1,462	4,155	10,273	0.005	46
207	3	1	10	4,604	60	1,475	4,165	10,304	0.002	15
208	2	1								
209	1	1								
210	0									
<b>Sum</b>									<b>22.48</b>	<b>276,241</b>

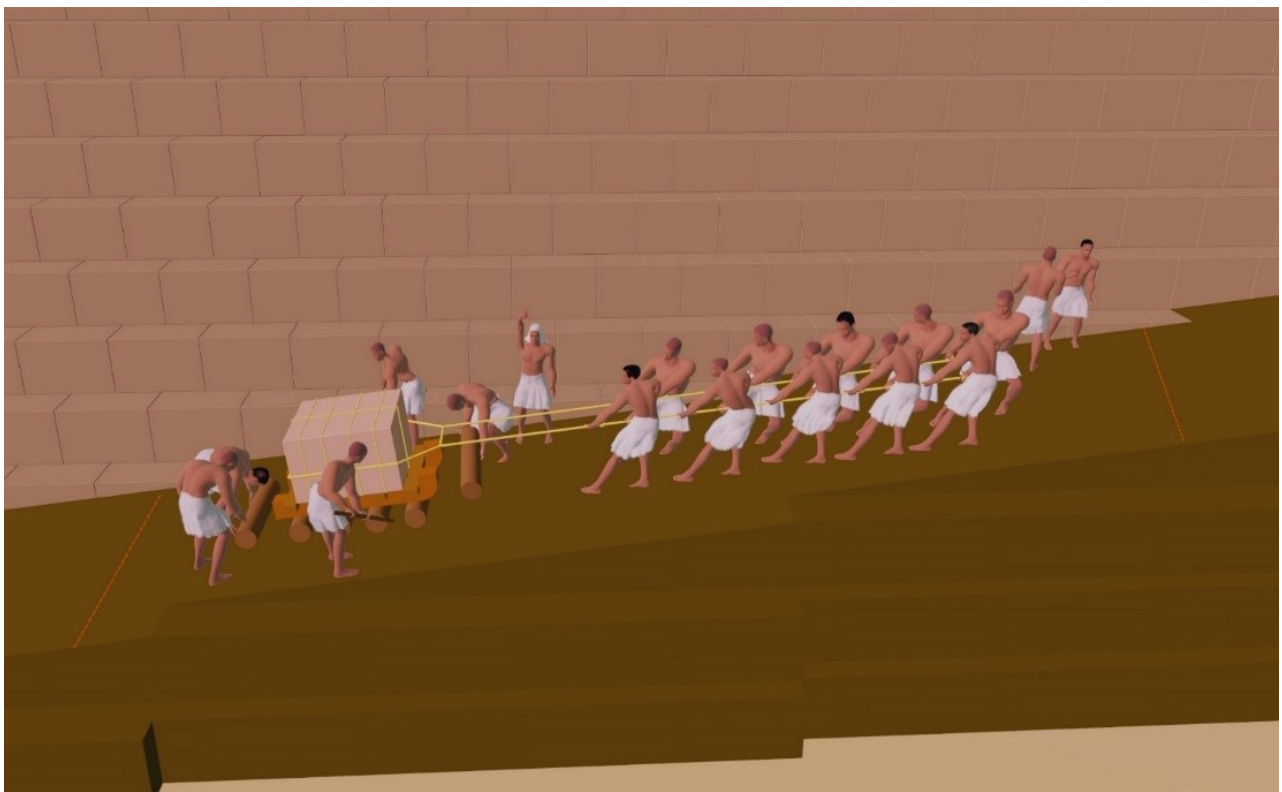
## Comparison of the two transportation techniques

The transportation technique with sliding sledges on lubricated wooden beams would have required many water carriers. Also, the ramps would have been wider by 20 % what required additional workers for building ramps.

Construction time for the inner step pyramid: **22.5** years

Total amount of the labor time of all workers: **276** thousand years

Let's compare this with the transportation technique using wooden rollers.



Construction time for the inner step pyramid: **19** years

Total amount of the labor time of all workers: **232** thousand years

**In summary, if the sliding technology had been used instead of the wooden rollers, the entire construction process would have lasted 3.5 years longer and required 20 % more work.**