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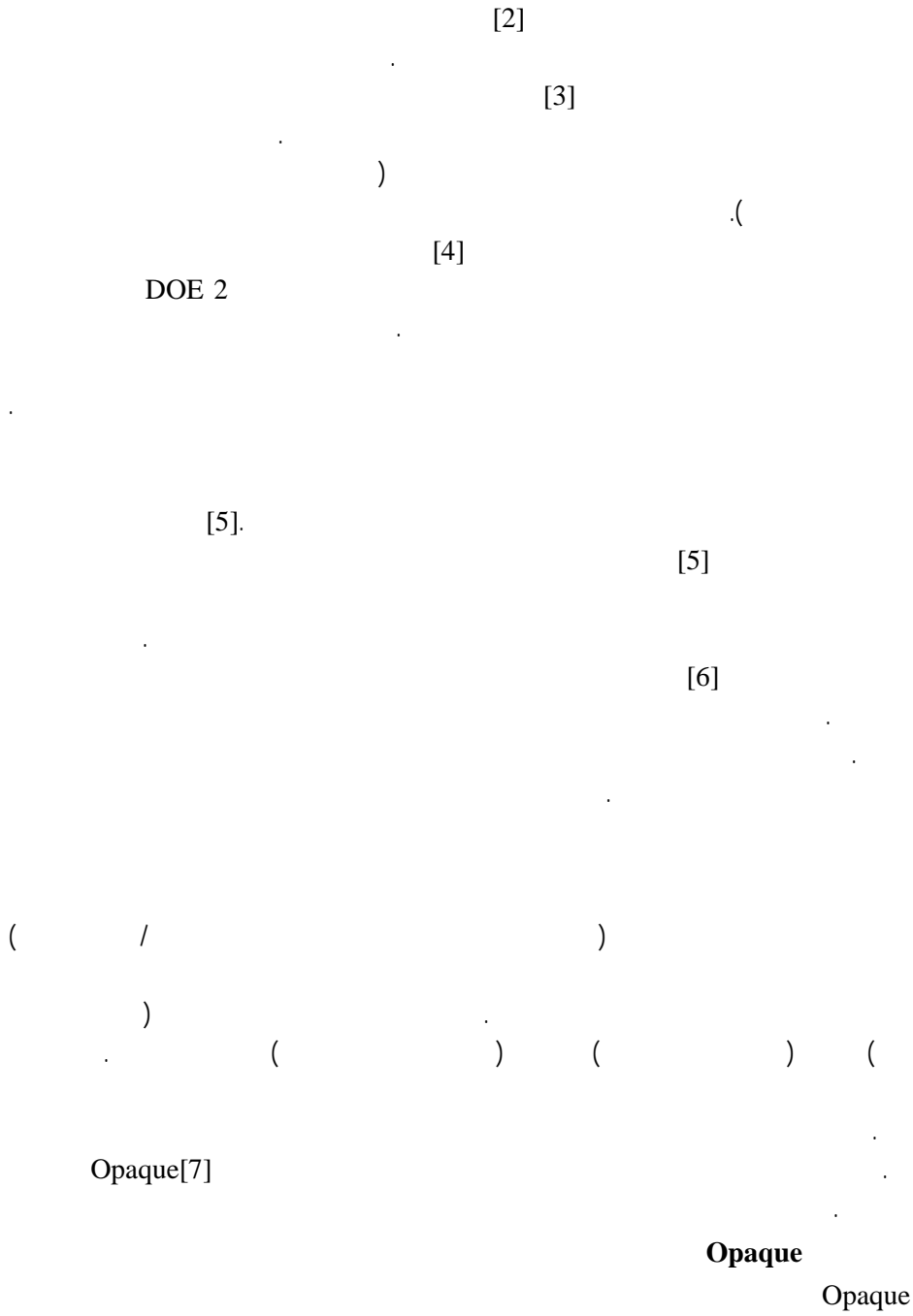
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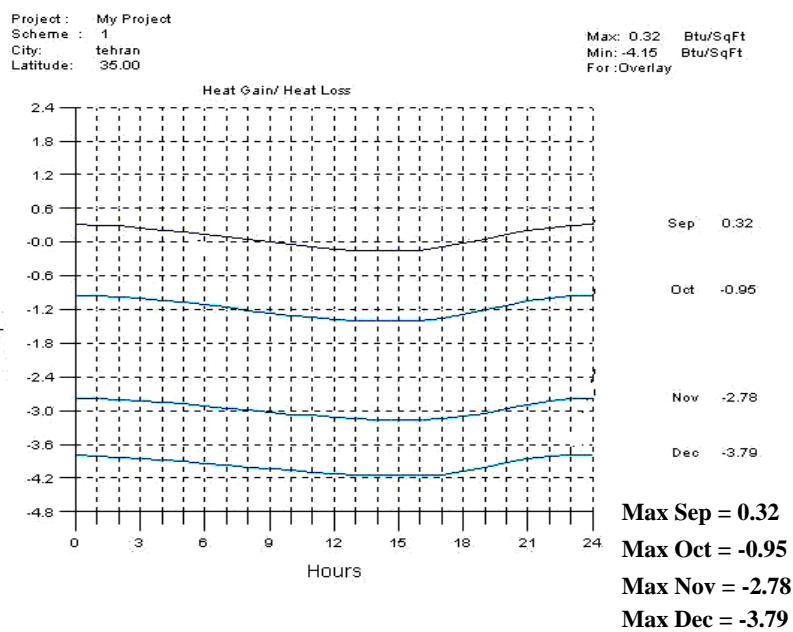
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Opaque

$$T_{sa}(t) = \frac{|T_{max} - T_{min}|}{2} \sin\left(\frac{2\pi t}{p} - \frac{\pi}{2}\right) + \frac{|T_{max} - T_{min}|}{2} + T_{min} \quad ()$$

$$k \frac{\partial^2 T}{\partial x^2} = \rho C_p \frac{\partial T}{\partial t} \quad (1)$$

C_p ρ k T

$$k \left(\frac{\partial T}{\partial x} \right)_{x=0} = h_i [T_{x=0}(t) - T_i] \quad (2)$$

$$k \left(\frac{\partial T}{\partial x} \right)_{x=L} = h_o [T_{sa}(t) - T_{x=L}(t)] \quad (3)$$

h_i, h_o

[8].

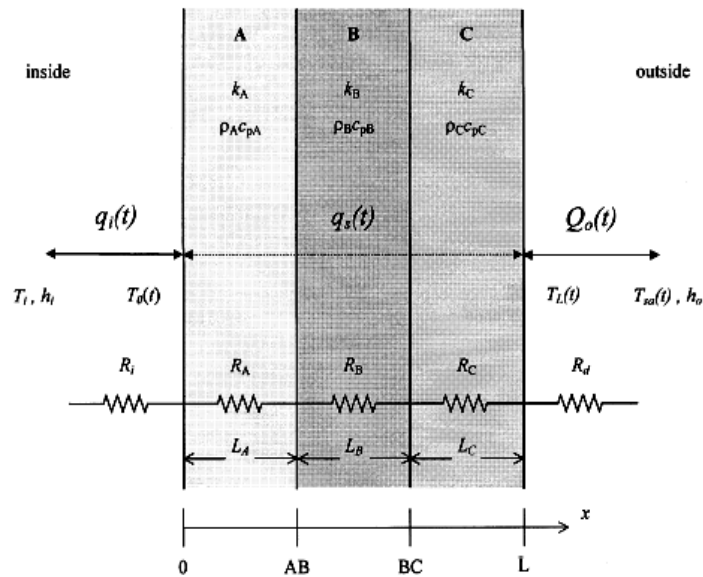


Fig. 3. The schematic of the problem geometry.

$$\begin{aligned}
 & \text{+ +} \\
 & \text{(glass wool)} \\
 & \text{:} \\
 & \begin{array}{cccc}
 (1.3 \text{ cm}) & + (5 \text{ cm}) & + (20 \text{ cm}) & + (1.9 \text{ cm}) \\
 + (10 \text{ cm}) & + (5 \text{ cm}) & + (10 \text{ cm}) & + (1.9 \text{ cm}) \\
 & & & (1.3 \text{ cm}) \\
 (1.3 \text{ cm}) & + (20 \text{ cm}) & + (5 \text{ cm}) & + (1.9 \text{ cm}) \\
 & + (20 \text{ cm}) & + (2.5 \text{ cm}) & + (1.9 \text{ cm}) \\
 + (10 \text{ cm}) & + (2.5 \text{ cm}) & + (10 \text{ cm}) & + (1.9 \text{ cm}) \\
 & & (1.3 \text{ cm}) & + (2.5 \text{ cm}) \\
 & + (10 \text{ cm}) & + (2.5 \text{ cm}) & + (1.9 \text{ cm}) \\
 & & (1.3 \text{ cm}) & + (10 \text{ cm}) & + (2.5 \text{ cm}) \\
 (1.3 \text{ cm}) & + (20 \text{ cm}) & + (1.9 \text{ cm}) & & \text{:}
 \end{array}
 \end{aligned}$$

$$\left(\quad - \quad - \quad \right) \quad \frac{1}{h_i} = 0.61, \quad \frac{1}{h_o} = 0.17 \left[\frac{\text{m}^2 \cdot \text{K}}{\text{W}} \right]$$

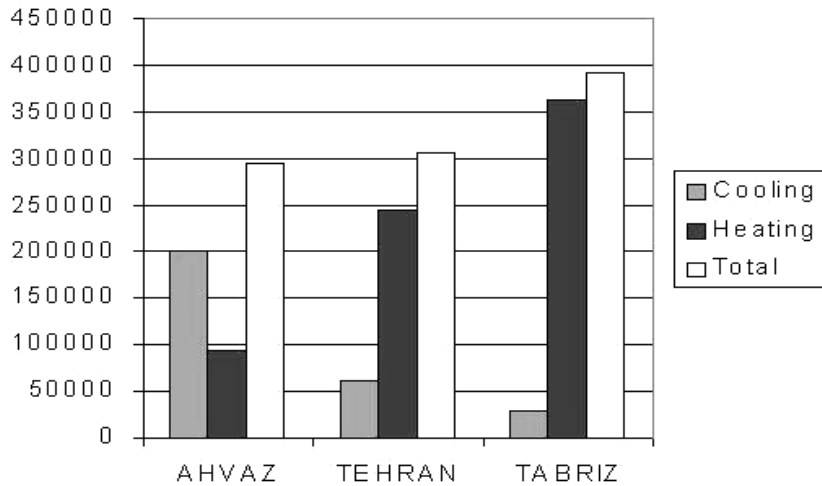
$$\left(\quad \quad \quad \right)$$

$$\left[\frac{W}{m^2} \right]$$

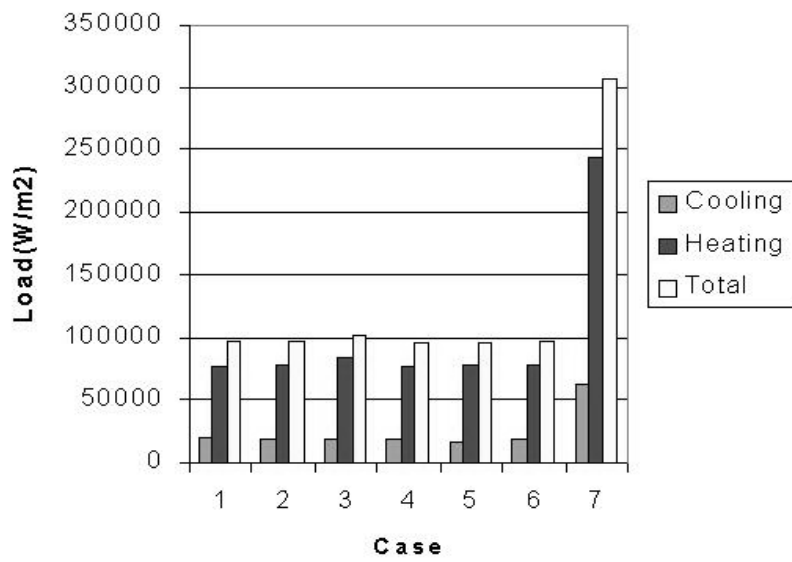
W/m2	Loads	East			North		
		Tehran	Tabriz	Ahvaz	Tehran	Tabriz	Ahvaz
Case 1	Cooling	4272	1826	11874	2766	953	10799
	Heating	14986	22236	5631	17337	24498	6946
	Total	19258	24062	17505	20103	25452	17746
Case 2	Cooling	4057	1805	12857	2769	950	10776
	Heating	15000	22246	5631	17214	24515	6936
	Total	19058	24052	18488	19984	25465	17712
Case 3	Cooling	3692	1873	12380	2946	967	10946
	Heating	16948	21963	4953	20120	24689	6977
	Total	20641	23837	17333	23067	25656	17923
Case 4	Cooling	4009	1798	12891	2742	960	10717
	Heating	15425	22260	5604	15187	24511	6871
	Total	19435	24058	18495	17929	25472	17589
Case 5	Cooling	3934	1761	12431	2704	907	10837
	Heating	15105	22164	5645	17258	24545	6943
	Total	19040	23925	18076	19963	25453	17780
Case 6	Cooling	4054	1788	12918	2749	947	10723
	Heating	14949	22232	5604	17245	24526	6926
	Total	19003	24021	18522	19994	25473	17649
Case 7	Cooling	13013	6125	41767	9845	6667	37730
	Heating	48580	70745	17681	50836	75661	20096
	Total	61594	76871	59448	60681	82328	57827

$$\left[\frac{W}{m^2} \right]$$

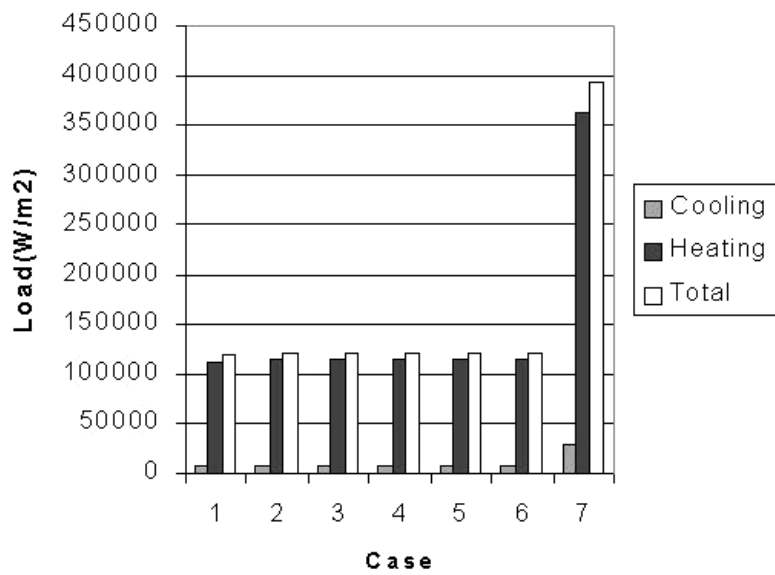
W/m2	Loads	South			West			Roof		
		Tehran	Tabriz	Ahvaz	Tehran	Tabriz	Ahvaz	Tehran	Tabriz	Ahvaz
Case 1	Cooling	4922	1580	10285	4013	1791	12890	3073	1199	11167
	Heating	11722	19650	6350	15306	20870	5610	18243	25799	7740
	Total	16645	21231	16635	19319	22662	18501	21317	26998	18908
Case 2	Cooling	3781	1573	12611	4037	1812	12860	3042	1206	11307
	Heating	12795	19650	3761	15089	22256	5532	18192	26167	7733
	Total	16577	21224	16373	19126	24069	18393	21234	27373	19040
Case 3	Cooling	3893	1788	9235	4817	1914	11157	3253	1185	11266
	Heating	12864	19749	6009	15204	21950	7413	18328	25854	7611
	Total	16758	21537	15245	20021	23864	18570	21582	27039	18877
Case 4	Cooling	3812	1533	12557	3994	1788	12887	3294	1192	11177
	Heating	12936	19500	3750	15020	22326	5621	18233	25799	7774
	Total	16749	21033	16308	19015	24114	18508	21527	26992	18952
Case 5	Cooling	3767	1516	12588	4023	1766	12898	3018	1161	11130
	Heating	12942	19568	3774	14724	22212	5665	18171	25891	7825
	Total	16710	21084	16362	18747	23978	18563	21190	27053	18955
Case 6	Cooling	3805	1533	12605	4023	1778	11276	3011	1188	11157
	Heating	12956	19589	3735	15027	22338	5624	18212	25806	7781
	Total	16761	21122	16340	19050	24116	16901	21224	26995	18938
Case 7	Cooling	15156	5832	43102	13763	6905	41920	11020	4394	36793
	Heating	39246	62814	12860	46553	71123	17919	58682	83388	24644
	Total	54403	68647	55963	60317	78029	59840	69703	87783	61438



$$\left[\frac{W}{m^2} \right]$$



$$\left[\frac{W}{m^2} \right]$$



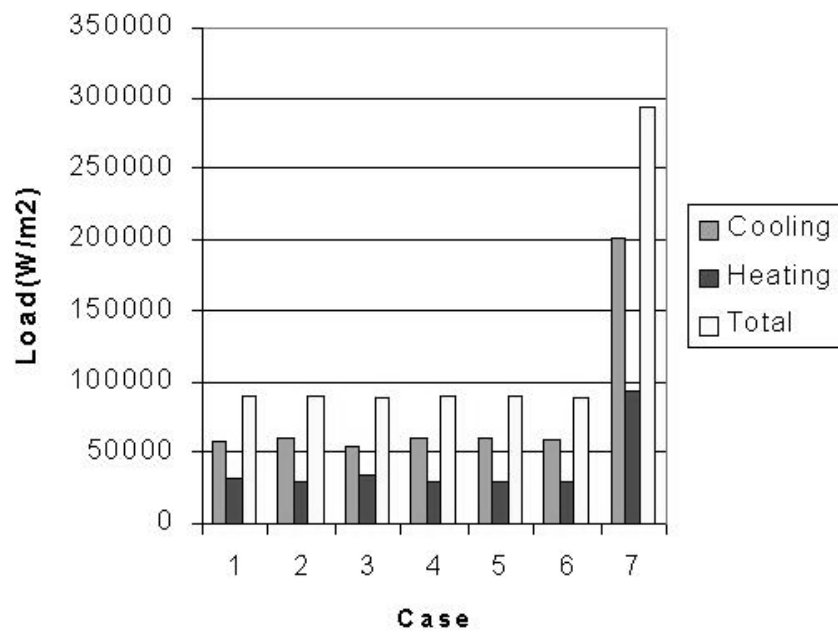
$$\left[\frac{W}{m^2} \right]$$

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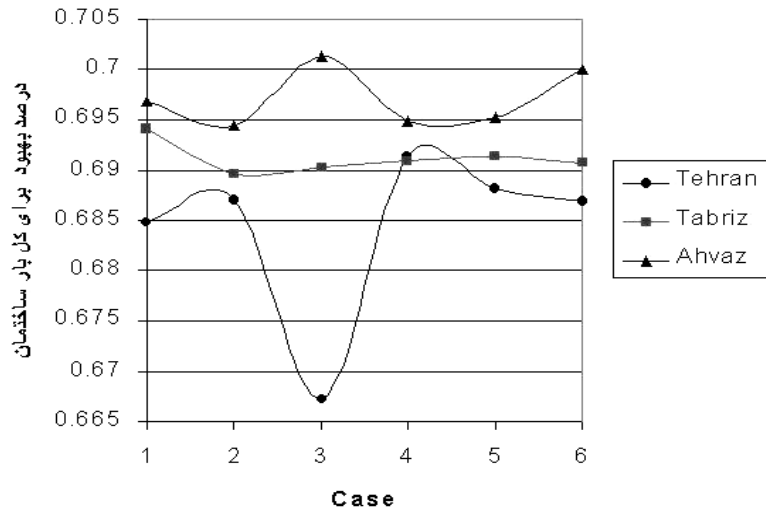


$$\left[\frac{W}{m^2} \right]$$

Tehran			
Case	Cooling	Heating	Total
1	0.696688	0.681852	0.684891
2	0.718344	0.678994	0.687052
3	0.703758	0.657789	0.667199
4	0.715717	0.685099	0.691369
5	0.72215	0.679363	0.688125
6	0.719061	0.678596	0.68688

Tabriz			
Case	Cooling	Heating	Total
1	0.754353	0.689184	0.694136
2	0.754453	0.684285	0.68962
3	0.741688	0.686017	0.69025
4	0.756959	0.685489	0.690923
5	0.762339	0.68553	0.691367
6	0.758195	0.685228	0.690776

Ahvaz			
Case	Cooling	Heating	Total
1	0.716781	0.653659	0.696805
2	0.699907	0.682478	0.694388
3	0.726869	0.64632	0.701375
4	0.700811	0.682178	0.694914
5	0.702534	0.679699	0.695305
6	0.708515	0.681652	0.700014



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