

学术论文

广州亚运城台球壁球综合馆结构设计

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摘要: 广州亚运城台球壁球综合馆空间造型复杂,下部结构为钢筋混凝土框架结构,屋盖为刚架-支撑体系的大跨度钢结构。主结构的支承体系在馆内分设箱形内环与空间桁架外环,有效过渡环内外不共面刚架,保证屋盖构件传力的有效性和连续性,同时在屋盖面内设置高强度合金钢拉杆以提高结构的整体稳定性,并对屋盖钢结构节点进行合理设计。对在恒荷载、活荷载、风荷载、温度及地震作用下的结构计算分析可知:本结构不属于风敏感体系,地震效应明显,较薄弱点出现在竖向构件中钢管混凝土柱底和局部主刚架支座处;大跨度钢结构的温度效应也非常明显,在结构中部设置温度缝可有效减小温度应力。

关键词: 大跨度钢结构 钢结构设计 节点设计 温度作用 屈曲分析

Structural design of the Billiard and Squash Gymnasium for Asian Games in Guangzhou

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Abstract: The Billiards and Squash Synthetic Gymnasium for Asia Games of Guangzhou in a special structure with complicated features.The main structure is reinforced concrete frame with a large-span steel roof.The main structural supporting system is provided within the gymnasium with an inner box along with an external outer ring made with steel spatial truss,to effectively assure the continuity in force transfer of the roofing system.Tensile members are designed within the roofing system to enhance its stability.Through the analysis of dead load,live load,wind load,temperature and earthquake effects,it is found that the structure is not wind load sensitive,however dominated by earthquake loading,with some of the concrete-filled steel column bottom ends and a few frame at supports needing special attention.The temperature effect is very evident due to the large length,however,the temperature induced stresses can be reduced effectively with providing the expansion joint at middle of the structure.

Keywords: steel structure design joint design temperature effect buckling analysis

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