



EVALUASI AKUSTIK RUANG OLAHRAGA GELANGGANG INOVASI DAN KREATIVITAS UGM MENGGUNAKAN ODEON

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INTISARI

Gedung olahraga umumnya memiliki volume ruang besar dan tinggi, sehingga menimbulkan gema dan menurunkan kejelasan suara. Hal ini dapat mengganggu kenyamanan komunikasi saat berolahraga, serta menghambat penyampaian informasi penting. Gelanggang Inovasi dan Kreativitas (GIK) UGM, sebagai ruang olahraga sekaligus ruang multifungsi, memerlukan perhatian khusus terhadap kualitas akustik.

Pengukuran lapangan dilakukan berdasarkan standar ISO 3382-1:2009 dengan merekam sinyal impuls menggunakan loudspeaker *omnidirectional* dan mikrofon pengukuran pada beberapa posisi receiver di dalam ruang. Data hasil pengukuran kemudian digunakan untuk memvalidasi model akustik pada perangkat lunak Odeon Auditorium. Evaluasi dilakukan melalui tiga skenario desain yang membedakan luas penambahan absorber TVSorbs Sport eksisting, 870 m², dan 580 m². Skenario 2 dan 3 melibatkan pemasangan panel akustik pada dinding dan langit-langit, kemudian dianalisis menggunakan parameter T30, C50, C80, dan Speech Transmission Index (STI).

Hasil pengukuran kondisi eksisting menunjukkan ruangan memiliki kualitas akustik kurang layak untuk fungsi olahraga dan kegiatan serbaguna, dengan nilai T30 (4,26 s), C50 (4,42 dB), C80 (-2,19 dB), dan STI (0,41). Dari tiga skenario penambahan absorber seluas 580 m² memberikan hasil paling efisien karena mampu meningkatkan akustik ruangan dengan nilai T30 (2,0 s), C50 (1,27 dB), C80 (3,27 dB), STI (0,57), sekaligus memenuhi batas kenyamanan akustik tanpa penggunaan material berlebihan

Kata kunci: *Gedung olahraga, kualitas akustik ruang, ray tracing, odeon*

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ACOUSTIC EVALUATION OF SPORTS HALL AT GELANGGANG INOVASI KREATIVITAS UGM USING ODEON

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ABSTRACT

Sports halls generally have large and tall volumes, which can generate excessive reverberation and reduce speech clarity. This condition can disrupt communication comfort during sports activities and hinder the delivery of important information. The Gelanggang Inovasi dan Kreativitas (GIK) UGM, functioning as both a sports hall and a multifunctional space, therefore, requires special attention to its acoustic quality.

Field measurements were conducted in accordance with ISO 3382-1:2009 by recording impulse responses using an omnidirectional loudspeaker and measurement microphones at several receiver positions inside the hall. The measurement data were then used to validate the acoustic model developed in Odeon Auditorium software. The evaluation was carried out through three design scenarios that vary the additional area of TVSorbs Sport absorbers: existing condition, 870 m², and 580 m². Scenarios 2 and 3 involved the installation of acoustic panels on the walls and parts of the ceiling, and were analyzed using the parameters T30, C50, C80, and Speech Transmission Index (STI).

The existing condition measurements indicate that the hall has inadequate acoustic performance for sports and multifunctional activities, with T30 (4.26 s), C50 (4.42 dB), C80 (-2.19 dB), and STI (0.41). Among the three scenarios, adding 580 m² of absorbers provides the most efficient improvement, achieving T30 (2.0 s), C50 (1.27 dB), C80 (3.27 dB), and STI (0.57), while meeting acoustic comfort standards with minimal material usage.

Keywords: *Sports hall, room acoustic quality, room acoustic quality, ray tracing*

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