

Bandar Udara Rendani di Manokwari memiliki peran strategis dalam mendukung konektivitas wilayah. Meningkatnya aktivitas penerbangan menuntut evaluasi kondisi perkerasan yang andal tanpa merusak struktur, salah satunya melalui uji *Heavy Weight Deflectometer* (HWD). Penelitian ini membandingkan performa tiga *software backcalculation* yaitu: ELMOD 6, BAKFAA, dan PCASE 7.0.7 dalam memperkirakan modulus elastisitas lapisan perkerasan berdasarkan data HWD.

Metode penelitian meliputi pengolahan data defleksi dari pengujian *Heavy Weight Deflectometer* (HWD) untuk menilai akurasi, stabilitas hasil, dan kesesuaian terhadap standar FAA. Analisis dilakukan terhadap tiga *software backcalculation* ELMOD 6, BAKFAA, dan PCASE 7.0.7 berdasarkan kemampuan dalam menghasilkan nilai modulus yang mendekati *seed moduli*, respons terhadap variasi konfigurasi lapisan dan asumsi CBR tanah dasar, serta nilai *residual error* (RMSE). Selain itu, perbandingan metode perhitungan dan kinerja masing-masing *software* dianalisis lebih lanjut melalui penilaian multi-kriteria untuk menentukan keunggulan relatif dari ketiganya.

Hasil analisis *backcalculation* terhadap data defleksi HWD di Bandara Rendani menunjukkan bahwa ELMOD 6 menghasilkan nilai modulus elastisitas yang relatif mendekati *seed moduli* dan sesuai dengan standar FAA. ELMOD 6 juga mencatat nilai RMSE terendah dan konsistensi hasil yang tinggi. PCASE 7.0.7 menunjukkan performa cukup stabil, sementara BAKFAA menghasilkan nilai yang cenderung tidak konsisten. Perbedaan kinerja ini dipengaruhi oleh algoritma, sensitivitas terhadap *input*, dan kemampuan pemodelan masing-masing *software*. Berdasarkan penilaian multi-kriteria, ELMOD 6 memperoleh skor tertinggi (3,8), diikuti PCASE 7.0.7 (3,2) dan BAKFAA (2,2), sehingga ELMOD 6 direkomendasikan sebagai *software* yang andal untuk analisis *backcalculation* perkerasan bandar udara.

Kata Kunci: *heavy weight deflectometer*, *backcalculation*, ELMOD 6, BAKFAA, PCASE 7.0.7.

Rendani Airport in Manokwari holds a strategic role in supporting regional connectivity. The increasing volume of air traffic requires a reliable evaluation of pavement conditions without damaging the structure, one of which can be conducted through Heavy Weight Deflectometer (HWD) testing. This study compares the performance of three backcalculation software programs ELMOD 6, BAKFAA, and PCASE 7.0.7 in estimating the elastic modulus of pavement layers based on HWD data.

The research method involves processing deflection data from HWD testing to assess accuracy, result stability, and compliance with FAA standards. The three software programs were analyzed based on their ability to produce modulus values close to the seed moduli, their response to variations in layer configuration and subgrade CBR assumptions, and their residual error (RMSE) values. Furthermore, differences in computational methods and performance were evaluated using multi-criteria assessment to determine the relative strengths of each software.

The results of the backcalculation analysis based on HWD deflection data at Rendani Airport indicate that ELMOD 6 produces elastic modulus values that are relatively close to the seed moduli and comply with FAA standards. ELMOD 6 also recorded the lowest RMSE value and demonstrated high consistency in its results. PCASE 7.0.7 showed relatively stable performance, while BAKFAA yielded values that tended to be inconsistent. These performance differences are influenced by each software's algorithm, sensitivity to input parameters, and modeling capabilities. Based on a multi-criteria assessment, ELMOD 6 achieved the highest score (3.8), followed by PCASE 7.0.7 (3.2) and BAKFAA (2.2). Therefore, ELMOD 6 is recommended as a reliable software for airport pavement backcalculation analysis.

Keywords: *heavy weight deflectometer, backcalculation, ELMOD 6, BAKFAA, PCASE 7.0.7.*