Desain produk inkubator bayi kembar berbasis sistem inkubator grashof = Product design of twin incubator based on the concept of grashof incubator

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Abstrak

Dengan permintaan inkubator untuk bayi permatur berada pada tingkat yang tinggi, khususnya di Indonesia dengan 675,500 bayi premature setiap tahunnya, konsep dari inkubator grashof telah dibuat untuk menyelesaikan masalah ini di Indonesia. Namun, muncullah sebuah masalah baru yaitu bayi prematur kembar. Proses desain inkubator bayi kembar mengikuti konsep dari inkubator grashof dengan volume yang lebih besar untuk menampung dua bayi. Dengan menggunakan 3D modelling software, desain produk ini berfokus pada mengadaptasi fungsionalitas dari inkubator grashof seperti menjaga temperature kabin di 33 C-35 C dengan konsep konveksi alamiah. Selain fungsionalitas, desain juga berfokus pada aspek ergonomis dan konsiderasi penggunaan material agar tetap menjaga sifat murah dan dapat diproduksi UKM. Penelitian pun dilakukan untuk memastikan suhu 33 C-35 C dapat terjaga. Sensor DS18B20 digunakan untuk mengukur temperatur yang diletakkan di sepuluh titik yang berbeda, dan sensor DHT22 digunakan untuk mengukur kelembaban. Hasil dari penelitian ini adalah inkubator bayi kembar dapat mencapai suhu yang dibutuhkan dengan menggunakan lampu pijar 4 x 15W.
<hr>As the demand for premature infant incubators are constantly high, especially in Indonesia as the fifth ranked country of the worlds most premature baby 675,700 babies per year, the concept of grashof incubator has been developed to fulfill the needs of Indonesian citizens. As the demand grows, the need to solve twin premature babies rsquo problem has been emerging ever since. The designation of Twin Baby Incubator follows the basic concept of existing grashof incubator with bigger volume as a mean to include two babies at the same time. Using 3D modelling software, the product design development mainly focuses on adapting the current functionalities of grashof incubator into the twin grashof baby incubator, such as keeping the babies rsquo cabin temperature at 33 C 35 C by allowing natural convention and natural circulation to occur. Beside the main functionalities, the design also focuses on ergonomic aspects as well as material consideration as a mean to improve usability and efficiency. Furthermore, a research was conducted to make sure that the temperature of 33 C 35 C can be achieved regardless bigger volume of babies rsquo cabin. As the design follows the concept of grashof incubator, the main components are light bulbs as the main heater and digital thermostat as a temperature controller. DS18B20 sensors are used to measure temperature where they are being placed at ten different points of measurements, and DHT22 sensor is placed to measure the level of humidity. The expected results of the research are the capability of developed twin incubator to achieve mandatory temperature, as mentioned above, inside the cabin using 4 x 15 W light bulbs.