

## Perancangan dan pengembangan produk mesin pemanen padi (Combine) portable

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### Abstrak

Pada dasarnya proses panen padi dapat dilakukan melalui dua macam cara, yaitu melalui cara tradisional dan menggunakan mesin perontok padi tipe stasioner. Mengingat adanya beberapa jenis lahan, maka kedua cara tersebut dirasa belum maksimal, sehingga perlu dilakukan perancangan dan pengembangan produk mesin pemanen padi (combine) portable. Mesin ini mempunyai kemampuan kerja merontokkan bulir padi dari batangnya dan sekaligus dapat menebang batang padi tersebut. Oleh karena itu untuk mewujudkan proses panen padi dengan menggunakan mesin yang dimaksud, telah dilakukan perancangan dan pengembangan produk mesin pemanen padi (combine) portable dengan menggunakan metode Karl T. Ulrich. Metode ini melalui beberapa tahapan, yaitu : Identifikasi kebutuhan konsumen, penyusunan dan pemilihan konsep rancangan produk, pengujian konsep serta penegasan spesifikasi produk, melakukan rancangan proses manufaktur, pembuatan prototipe dan uji lapangan. Adapun uji lapangannya terdiri dari : uji banding terhadap proses panen dengan cara tradisional/uji unjuk kerja (performance), uji verifikasi, uji pelayanan (handling) dan uji beban berkesinambungan (continuous loading). Disamping itu juga telah dilakukan analisa ekonomi teknik dan manajemen pengembangan produk, untuk mengetahui kelayakan ekonomis serta waktu yang diperlukan dalam perancangan dan pengembangan produk mesin tersebut.

Dari hasil perhitungan perancangan dan uji lapangan serta analisa ekonomi diperoleh spesifikasi prototipe mesin pemanen padi (combine) portable sebagai berikut : tinggi = 800 mm, Panjang = 1100 mm, lebar = 340 mm, Kapasitas lapang = 140 jam 1 ha, Tingkat kehilangan bulir padi = 5 %, Tingkat kebersihan bulir padi = 92,5 %, Efisiensi perontokkan bulir padi = 95 % dan Harga pokok produksi per-unit prototipe sebesar Rp. 3.186,500,- dengan harga \$ 1 = Rp. 9000, serta lama waktu perancangan dan pengembangan produk adalah 25 minggu.

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Basically, the process of harvesting rice can be done in two methods. That is, it can be done traditionally and by using a huller of stationer type. Considering that there are various kinds of soil, so both of the methods are regarded as un- maximal ones, then it is necessary to set up plans and to develop an industry of machines for harvesting rice ( combine portable). The machines must have the capacity of work for dropping grains of rice off their stalks and chopping down the stalks as well. Therefore, to bring such process of harvesting rice by using that machine into reality, the production of machines for harvesting rice have been designed and developed ( combine portable) by using the method of Karl T. Ulrich. This method is subjected to several steps, namely : the identification of consumers' need, arranging and choosing the concept of product design, examining the concept, affirmation of product specification, carrying out the concept of process of manufacturing, making a prototype and field trial for the prototype. As for the field trial, it consists of : comparing test/performance test between the process of harvesting crops by using traditional method and this prototype, verification test, handling test and continuous loading test. In addition, the engineering

economic analysis and the management of product development have been carried out to find out economic feasibility and the length of time which is needed to design and to develop the production of such machine as well.

From the result of calculation of designing and product trial, economic analysis as well the specification of the prototype ( combine portable)it is found as follows : the height = 800 mm, the length - 1100 mm, the width = 340 mm, the field capacity = 151 hour/hectare, the degree of grains loss = 5%, the degree of grain cleanliness = 97%, the efficiency in dropping-off of grains 92.5%. and the cost of goods manufactured per unit of prototype is Rp. 3,186,500 ( with currency rate ~1 = Rp.9000, time consumed for manufacturing and developing the product is 25 weeks.