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## Long term performance of industrial chipping operations

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Daily activity records were collected from six industrial chipper operators, consider representative of chipping specialists in Italy. Data collection covered a whole uninterrupted year of activity, from January to December. The sample was evenly divided between large industrial chippers with own independent engines (~350 kW), and smaller industrial chippers powered by large farm tractors (~ 200 kW). To facilitate comparison, machines within each group consisted of the same make and model. Daily records contained details of the work site, as well as information about work hours, fuel use and product output. The home range explored by each operator was very variable and it was not related to chipper class (i.e. large or small). Annual use varied between 800 and 2500 hours, and it was poorly related to chipper class. In contrast, mean hourly productivity was strongly related to chipper class and ranged from 40 and 100 m<sup>3</sup> loose volume. Fuel consumption varied between 0.4 and 0.7 L of diesel per m<sup>3</sup> of loose chips. Depending on the operator, annual fuel consumption varied between 16,000 and 68,000 L of diesel, which makes it worthwhile to implement the complex bureaucracy needed to obtain the fuel tax exemptions. The amount of chips produced before changing knives varied between 350 and 1500 m<sup>3</sup> loose volume, based on an annual average. There were significant differences between operators and chipper models, with respect to knife duration. The study also defined the minimum lot size considered by the different operators. It is also worth noticing that all three operators equipped with a tractor-powered chipper started with a much smaller tractor, and ended up replacing it with a larger one (about 30% more powerful) in order to reach optimum productivity and reliability.