INTERNATIONAL MULTIDISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
SJIF 2019: 5.222 2020: 5.552 2021: 5.637 2022:5.479 2023:6.563 2024: 7,805
eISSN :2394-6334 https://www.ijmrd.in/index.php/imjrd Volume 12, issue 08 (2025)

DEVELOPMENT OF CONSUMPTION NORMS FOR KD COMPONENT PARTS AND PACKAGING MATERIALS FOR THE B-CAR (ONIX) VEHICLE

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Abstract: Component cost analysis involves optimizing the use of materials, time, and energy in the development of models and components. Parts for expendable materials and the amount of resources (e.g. , metal , plastic) and their value evaluation . This in step the following calculation possible :
- Every one component part for necessary materials amount .
- Manufacturing release in the process usable energy and time .
Complementary parts spending analysis in doing construction documents working exit very important .
Keywords: B-Car, bolter, material, raw material, production, optimization, consumption, efficiency,

Developing consumption standards for components and packaging materials for the B-CAR (ONIX) vehicle is an important step in optimizing production processes, reducing costs, and increasing material efficiency. This process covers all stages, from vehicle production to product transportation.
When calculating the consumption of components for a B-CAR (ONIX) car, the dimensions, material type, and manufacturing process of each component are taken into account. Components include mechanical parts, electronic parts, and structural parts. As an example of calculating the consumption rates for components, if the size of a steel sheet is 2 m× 1 mand the total surface area of the material required for the car body 10 m²is, the number of steel sheets required is:

Po'number of lists= $\frac{10m2}{2m2}$ **=5lists**

- An additional 10% material allowance should be included in the bending or forming process of a steel sheet. Therefore, the total material quantity is:

10m2 × 1.1 = 11m2

Calculation of Packaging Material Consumption Rates
Packaging materials are materials needed for the transportation and storage of manufactured automotive parts or assemblies. Packaging materials include:
- Packaging boxes (cardboard boxes, plastic containers, wooden boxes).
- Cushioning materials (polyethylene, scotch tape, cotton, or other shock-absorbing materials).
- Packaging materials (plastic wrap, foil, etc.)
When calculating the consumption of packaging materials, the following should be taken into account:
Packaging and packing volume of parts - how we will wrap and pack each part or component. For example, if 10 parts fit in one box, it is necessary to calculate their total volume and the amount of material required.
Packaging efficiency - it is important to calculate the packaging efficiency when calculating the required amount of packaging materials. It shows how optimal the packaging is and the possibilities for reducing material waste. For example, if a box holds 10 parts and 0.5 m²cardboard is used for packaging, the amount of cardboard required for 100 parts is:

Cardboard material = 100 pieces × 0.5 m ^{2} = 50 m ^{2}

If softening materials (e.g. polyethylene) are used for each part 0.1 m², the amount of polyethylene required for 100 parts is:

Polyethylene material = 100 pieces × 0.1 m ^{2} = 10 m ^{2}

Table 3.4

Stages of Developing Consumption Norms

Group number	Stage name	Things to do	Result / document
1.	Formulation of the technical task	Modeling, technical requirements, operating conditions are studied	Technical assignment
2.	Making a preliminary list of details	The composition is determined by chassis, engine, and transmission.	Specification project
3.	List of analog products	Consumption standards and technologies in similar models are studied.	Analytical report
4.	Experience-gathering and testing	Actual costs are determined through collection in a pilot series	Test reports
5.	Regulatory calculations	The weight of the parts, material consumption, and losses are calculated.	Consumption norms (calculation tables)
6.	Expertise and approval	It is confirmed by technologists and economists.	Approved norm
7.	Input into the information system	It is included in the ERP or PLM system.	Digital database

Table 3.5

Time allocation for the stages of developing cost estimates

Stage	Time share (%)
Technical assignment	10
List of details	10
Analysis of analogues	15
Experience-gathering and testing	25
Regulatory calculations	20
Expertise and approval	10
Input into the information system	10

BOM (Bill of Materials) is also widely used in developing consumption standards.

di. BOM (Bill of Materials) is a document that lists all the materials, components, parts, and components used in the development and assembly of a product. BOM is a key component of the manufacturing process because it helps to achieve the following goals:

- Determining the materials needed for production.
- Calculation of parts consumption.
- Planning of production and assembly processes.
- Inventory management.

- Cost control.
- Ensuring product quality.

During the BOM creation process, details (name, quantity, dimensions, codes, and other necessary information) of each component or material are provided.

The steps for creating a BOM are detailed in the table below (for the Chassis part).

Table 3.6

Part code	Part name	Quantity	Unity	Consumption rate
SH-001	Frame	1	piece	1
SH-002	Front suspension	1	Collection	1
SH-003	Rear suspension	1	Collection	1
SH-004	Wheel (front)	2	piece	2
SH-005	Wheel (rear)	2	piece	2

Complementary Parts Spending Analysis To do is to product or the system working in the release usable all component quantity , quality , price of parts (components , materials , details) and them working in the output spending to study is a process . Complementary of parts spending analysis to do , to work release efficiency increase , expenses reduce inventory management and quality to provide for important . Complementary parts spending analysis to do one how many goals They are available . as follows :

1. Expenses reduce — product price reduce , resources effective use .
2. Materials and parts optimization — work release for necessary was materials amount correct mark .
3. Quality control — the quality of components and their compatibility.
4. Improving the production process - optimizing technologies and processes, increasing production efficiency.
5. Inventory and supply chain management — ensuring timely delivery of needed parts, reducing the output of excess materials and parts.

KD (Knocked Down) components are all the parts needed to assemble a car, which are delivered to the assembly site and transformed into a complete car during the assembly process. These parts are:

1. Mechanical parts - engine, transmission, wheels, chassis and suspension system parts.
2. Electronic components - wiring system, sensors, control module.
3. Body and exterior parts - doors, window frames, panels, body parts.
4. Interior parts - seats, panels, control system, air conditioning and other systems.
5. Fasteners - screws, nuts, glue and connectors.

When calculating the consumption rates for each detail:

- **Weight and dimensions:** The weight and dimensions of each detail are important in determining the consumption of materials.
- Thickness - the required thickness for the material (steel, aluminum, plastic, etc.)
- Body steel sheets - 2 m^2steel material, thickness 1 mm, weight 6.28 kg(1 m^2= 6.28 kg).
- Aluminum parts- 0.5 m^2aluminum panel, weight 2.2 kg(1 m^2= 4.4 kg).

Materials required to assemble 100 B-CAR (Tracker) vehicles:

- Steel materials - 6.28 kg/m^2 x 100 m^2= 628 kg.
- Aluminum materials - 2.2 kg/m^2 x 50 m^2 = 110 kg.

Packaging Material Consumption is the process of calculating the quantity and cost of materials used in the packaging of a product, ensuring that they are used in an efficient and

cost-effective manner. Efficient packaging material consumption is essential for reducing the overall costs of production and distribution processes, while ensuring product safety and quality. Packaging materials can be different, for example: cardboard, polyethylene, plastic, glass, aluminum, air bubbles, foamed materials and other materials. Each of them is selected depending on the type of product, packaging method and storage, transportation conditions. There are necessary calculations and methods to optimize consumption rates and properly use materials.

When optimizing the consumption of packaging materials and KD components, it is necessary to consider the following:

- The shape and size of the packaging materials should be designed to optimize transportation. For large parts, special packaging methods will be developed.
- Packaging materials should be made from environmentally friendly and recyclable materials. This is an important environmental factor in car manufacturing.
- The consumption rate for packaging materials and components should reduce production costs.

Packing materials needed for each car (for example, for 100 cars):

- Carton for steel panels: 100 pieces x 0.2 m^3 = 20 m^3 carton.
- Plastic packaging for electronics parts: 50 pieces x 1 m^2 = 50 m^2 of plastic.
- Silicone protection for window frames : 100 pieces x 2 m = 200 m of silicone.

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