

## NATURAL RUBBER UTILIZATION – CASE STUDY

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### Abstract

*Natural rubber is consumed as an industrial raw material. In rubber articles, the two kinds of elastomers are never distinguished by us as users. It could be natural, synthetic or blends of various rubbers in different proportions.*

*Above mentioned raw materials are used in many different end-products. The most important is the tyre sector taking about half the total elastomer consumption. The other category, general rubber goods, includes hoses, belting, footwear, surgical goods, and rubberized cloth.*

*This case study is focused on the natural rubber consumption in the company Gumárny Zubří, Jsc. (GUZU)<sup>1</sup>. There have been observed especially territorial structure of natural rubber imports and imported quantity of this raw material in the period 1998 – 2005. Reasonable investment management (after the year 1989 and privatisation) has given the possibility to prevail over a sector competition. Production expansion needs new employees hence GUZU also plays important role in employment in the East Moravia region.*

**Key words:** rubber producing industry, synthetic rubber, natural rubber, Gumárny Zubří, Jsc.

### INTRODUCTION

Natural rubber and the different types of synthetic rubbers are used in many different end-products. The most important is the tyre sector taking about half the total elastomer consumption. The other category, general rubber goods, includes hoses, belting, footwear, surgical goods, and rubberized cloth. One of the most important representative of the mentioned second category is rubber processing plant Gumárny Zubří, Joint-stock company.

The manufacturing plant Gumárny Zubří was established in 1935. In the more than 60 years of its operations it has achieved and maintained the stable position in the market and has produced and sold the products in the value of tens milliards CZK. The first manufacturing programme was based on the "Leyland" masks which were used as the protection against noxious gases. After 1945, the manufacturing assortment was extended to include sole plates, painting rollers, children toys and other products made of technical rubber.

In 1959, the manufacturing of driving belts with steel cords was initiated. The gradual transformation from compression pressing to injection technology began in 1970. In 1974, the plant introduced new equipment for the manufacturing of rubber compounds. Thus, the rubber plant Gumárny Zubří became one of the biggest producers of the superior rubber products in Czechoslovakia. At present, the manufacturing is focused especially on technical rubber for automotive, engineering and constructive industries, and for protective masks.

At 1.1.1991 the former state-owner enterprise was transformed into the joint-stock company. Technical

and investment development passed in the following period and made a present technical and technological

level of production possible. At 1.7.1997 the privatization of GUZU was successfully finished and the firm Granitol Moravský Beroun became the major owner.

#### Production programme in GUZU, Jsc.:

This company produce rubber products for:

- Automotive industry
- Engineering
- Building industry
- Agriculture
- Consumer industry

The detailed classification of the production is mentioned in appendix to this article.

#### GUZU in current time

This company has its own manufacture of rubber compounds and charges for conventional hydraulic and injection presses. The injection moulding machines are made mostly by Desma, Engel and by Czech producers.

The great independence in introducing new products is guaranteed by the technical preparation of production (compounds, exploration, documentation of products and of moulds) and by the manufacturing of moulds in the own workshop. To assure quality and the technical level of the products, the quality assurance system in accordance with ISO 9001/2000 and ISO TS 16949 series is being introduced with a view to direct deliveries for automotive industry. After the year 1989 and following privatisation in GUZU had to solve problems with the functioning of company in new conditions. Thanks to the good manager practice and to the reasonable investments is

<sup>1</sup> Place of the case study: Gumárny Zubří, Jsc.,  
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Date of data collecting: May 15<sup>th</sup> – 17<sup>th</sup> 2006

now GUZU a succesfull enterprise in the rubber producing industry both in the Czech Republic marketplace and abroad. In the Table 1 are listed its main customers:

**Tab. 1. :** Customers structure in GUZU, Jsc.

Inland customers:	Foreign customers:
<p><b>Autopal Nový Jičín (Visteon)</b>  <b>Denso Liberec</b>  <b>Dukla CZ Trutnov</b>  <b>Dura Kopřivnice</b>  <b>EPCE Slaný</b>  <b>Gemi Hustopeče</b>  <b>Gorenje Praha</b>  <b>Hella Mohelnice</b>  <b>KSK Belt Teplice</b>  <b>Merkuris Čáslav</b>  <b>PAL Praha</b>  <b>Project Controls Kyjov</b>  <b>Schaknat Kravaře</b>  <b>Škoda Auto Mladá Boleslav</b>  <b>Tatra Kopřivnice</b>  <b>Tesla Blatná</b>  <b>Valeo Rakovník</b>  <b>VDO Adršpach</b>  <b>Zetor Brno</b></p>	<p><b>Audi</b>  <b>BMW</b>  <b>DC</b>  <b>Delphi Automotive Systems</b>  <b>Doma Plattling</b>  <b>Dunlop Tech Hanau</b>  <b>Hammerlit Leer</b>  <b>Henniges Rehburg</b>  <b>Michels Grossmehring</b>  <b>Paguag Düsseldorf</b>  <b>Služba Nitra</b>  <b>Stawac Remscheid</b>  <b>VW</b></p>

Source datas from: [www.guzu.cz](http://www.guzu.cz)

**Employment:**

With respect to the socioeconomic situation in region of East Moravia observed rubber processing plant has important role in providing new engagements. The

employment development corresponds to the current process of increasing the efficiency of the company's operation. Table 2 - shows employee structure development divided by activity.

**Tab. 2. :** The average number of employees in GUZU, Jsc.

Activity	2002	2003	2004
<b>Rubber industry</b>	461	483	494
<b>Engineering</b>	84	84	79
<b>Others</b>	167	166	181
<b>Total</b>	712	733	754

Source datas from the Annual report GUZU, Jsc. 2004

At the beginning of 2006, cca 850 employees worked for the company. This company pays great attention to training its employees. This is focused, in particular, on professional and development activities. At present special training programmes for foremen are under way,

and management skills training and language courses are in progress. (personnel advice, Farkašová, E.)

**Used materials:**

The main part of material reserves in GUZU, Jsc, is composed from synthetic rubber (SBR – Styrene Butadiene Rubber or BR – Polybutadienne Rubber).

Natural Rubber is used for rubber blends. Mixed rubber has better properties than only synthetic or natural rubber. A great deal of natural rubber imports has origin in Malaysia because of its best quality and propriety for the company’s production programme. In the Table 3

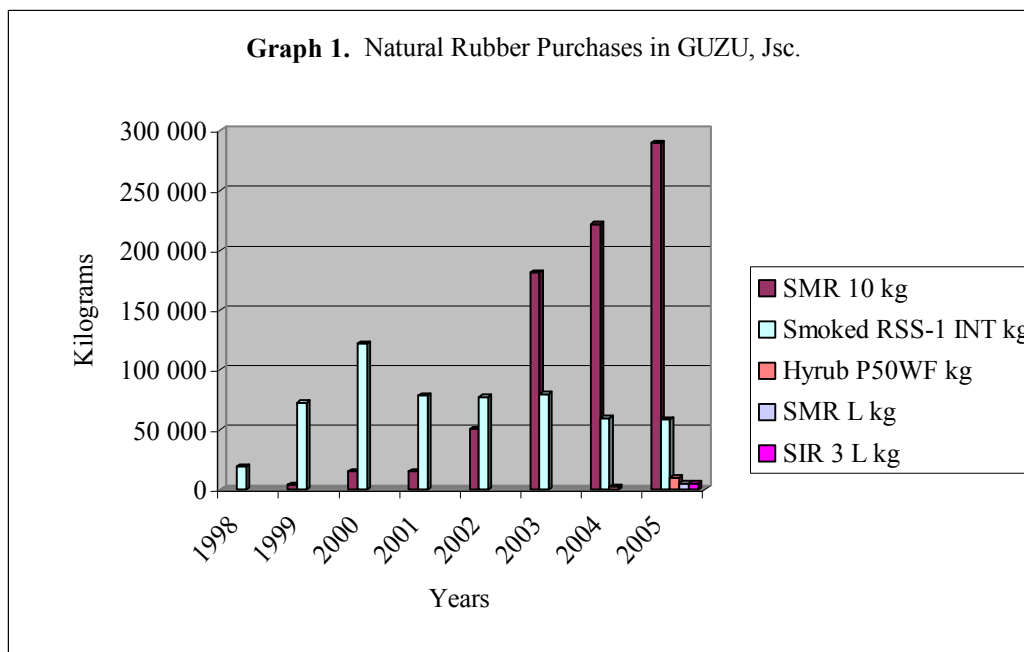
are listed natural rubber purchases in GUZU in the period 1998 – 2005. The mid letter in the shortage of technical type means the origin ( SIR – Indonesia, SMR – Malaysia). (personnel advice, GUZU, 16.5.2006)

**Tab. 3. :** Natural Rubber Purchases in GUZU, JSc.

Years	SMR 10		Smoked RSS-1 INT		Hyrub P50WF		SMR L		SIR 3 L	
	kg	CZK	kg	CZK	kg	CZK	kg	CZK	kg	CZK
1998			19 200,00	768 000,00						
1999	3 750,00	116 250,00	72 398,40	2 620 147,20						
2000	15 120,00	475 524,00	121 920,00	3 959 048,00						
2001	15 120,00	495 936,00	78 660,00	2 658 708,00						
2002	50 400,00	1 264 200,00	77 460,00	2 180 500,45						
2003	181 300,00	5 756 100,00	79 680,00	2 938 032,00						
2004	221 760,00	8 152 830,00	59 520,00	2 367 870,00	2 420,00	94 380,00				
2005	289 800,00	10 148 039,24	58 560,00	2 369 090,00	10 080,00	402 430,00	5 040,00	199 990,00	5 040,00	206 360,00

Source datas: material stock cards GUZU, with the agreement of Ing. Eva Farkašová, 16.5.2006, modified

Note: Values in CZK are measured in current prices.



Source datas: material stock cards GUZU.

The material consumption almost corresponds to purchases, in stock the approximately reserve of 15 000 kg of natural rubber is kept. An importance of another rubber technical types is declining, a position of SMR 10 is strengthening because of its good technical

properties and relative good price conditions. In the Table 4 is shown purchase prices development of the two main technical types of natural rubber in the period 1998-2005.

**Tab. 4. :** Purchase prices development in years 1998-2005 (SMR 10, RSS-1 INT)

Years	SMR 10			Smoked RSS-1 INT		
	kg	CZK	Price CZK per kg	kg	CZK	Price CZK per kg
1998				19 200,00	768 000,00	<b>40,00</b>
1999	3 750,00	116 250,00	<b>31,00</b>	72 398,40	2 620 147,20	<b>36,19</b>
2000	15 120,00	475 524,00	<b>31,45</b>	121 920,00	3 959 048,00	<b>32,47</b>
2001	15 120,00	495 936,00	<b>32,80</b>	78 660,00	2 658 708,00	<b>33,80</b>
2002	50 400,00	1 264 200,00	<b>25,08</b>	77 460,00	2 180 500,45	<b>28,15</b>
2003	181 300,00	5 756 100,00	<b>31,75</b>	79 680,00	2 938 032,00	<b>36,87</b>
2004	221 760,00	8 152 830,00	<b>36,76</b>	59 520,00	2 367 870,00	<b>39,78</b>
2005	289 800,00	10 148 039,24	<b>35,02</b>	58 560,00	2 369 090,00	<b>40,46</b>

Source datas: material stock cards GUZU, modified.

For the comparison with the international commodity exchange prices see Table 6 in appendix. There are shown prices of natural and synthetic rubber in the period 2004 – 2006 by quarters. Prices are quoted in USD or Euro per tonn. Quotations have origin in the world known commodity stock exchanges.

**SUMMARY**

GUZU, Jsc., is the rubber manufacturing plant established in 1935. In the more than 60 years of its operations it has achieved and maintained the stable position in the market and has produced and sold the

products in the value of tens milliards CZK. Material resources are mainly composed by the synthetic and natural rubber (NR). The most widely used technical type of natural rubber is SMR 10 originated in Malaysia. The plant produces goods for the automotive industry, engineering, building industry, agriculture and consumer industry.

On the present proceeds in the company revitalisation programme aimed at rising to increasing material costs. Over all difficulties connected with privatisation is manufacturing plant succesful in meeting customers requirements and in the competitors fight.

**APPENDIX**

**Tab. 5. :** Production programme in GUZU, Jsc.

Company produce expecially moulded technical rubber products for:

<b>a) automotive industry</b>	technical pressings universal car mats special car mats mudflaps accumulator casings
<b>b) engineering</b>	parts for "white" engineering other technical pressings
<b>c) building industry</b>	antislip floor coverings and sheets from rubber granulated materials rubber pads of roof coverings and rubber stairs for roofs railway pads for railway lines and transport companies sealings for concrete, plastic and stoneware pipelines
<b>d) agriculture industry</b>	hoses for milking units

<b>e) consumer industry</b>	
<b>Rubber compounds:</b>	<p>for general applications                      oil resistant                      heat resistant                      dynamic                      ozone resistant                      for retreading of tyres of passengers cars, trucks and tractors</p>
<b>Moulded technical rubber:</b>	<p>The main products include various sealings, rings, collars, frames, grommets, bushings, dust catchers, diaphragms, covers, couplings, expansions joints, breakers and stops</p>
<b>Rubber products for passenger cars and trucks:</b>	<p>sealing elements, engine bonnet sealings, profiled parts for air inlet and cooling systems, end caps of electric ignition cables (silicone, EPDM), combined rubber-metal and rubber-plastic products, grommets for ignition harness, damping elements of cars, rubber dust catchers, collars, covers, pedal coverings                      universal car mats for 30 world car marks and 300 car types                      special car mats for 25 world car marks and 130 car types                      luggage boot mats for passenger cars                      mudflaps                      tilt stretchers                      mudguards</p>
<b>Protective masks for:</b>	<p>armed forces, protection of civil persons, police, fire protection, nuclear power plants, industrial plants, deratization teams etc...                      Hard rubber products:                      AKU casings, caps and plugs for batteries of passenger cars, trucks, tractors, buses and military vehicles                      Electric switchboards for civil engineering and other applications</p>
<b>Profiled rubber from homogeneous material for:</b>	<p>sealings for car lamps                      sealings for concrete, plastic and stoneware pipelines and shafts                      frames for sheet glass transportation and storage                      fixing metal sleeves for water, gas and oil pipelines                      greenhouses                      window glazing                      other applications as required by the customers and subject to the technological possibilities</p>
<b>Non-skid rubber floor coverings:</b>	<p>non-skid design to be used in interiors consisting of sheets 500 x 500 mm and 703 x 703 mm (to be bonded to concrete, wood and metal)</p>
<b>Combined rubber/metal products:</b>	<p>travel wheels with cast iron or aluminium discs                      products according to customers requirements</p>
<b>Rubber sheets with or without fabric ply:</b>	<p>main dimensions: 650 x 650 mm                      thickness: 1,2,3,4,5,6,8,10,12 and 20 mm</p>

	material: oil resistant, heat resistant and general application rubber
<b>Household products and other goods of consumption:</b>	sink cleaners (for cleaning sink, wash-basin and bath-tub outlets – 3 sizes) non-skid mats for bath-tubs and shower cabinets door sealings and other parts for automatic washing machines dough scrapers door mats and others
<b>Railway pads and sole plates for:</b>	tram tracks subway tracks

Source datas from: www.guzu.cz

**Tab. 6. :** Rubber Price Development and Related Indicators

2004	2005					2006				
Year	Q1	Q2	Q3	Q4	Year	Q1	Q2	Q3	Q4	Year

**NATURAL RUBBER PRICES (3)**

Europe, TSR20 €/tonne	<b>1039</b>	976	1056	1311	1446	<b>1197</b>	1646				
SICOM, RSS3, S\$/tonne	<b>2187</b>	2057	2292	2809	2841	<b>2500</b>	3230				
New York, TSR20, US\$/tonne	<b>1350</b>	1354	1381	1625	1783	<b>1535</b>	2018				

**RELATIVE NR/SR PRICE RATIO**

New York, TSR20 / USA SBR	<b>100.8</b>	83.9	84.3	102.8	111.9	<b>95.6</b>					
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**SYNTHETIC RUBBER PRICES**

USA SBR Export Values US\$/tonne	<b>1339</b>	1614	1638	1581	1594	<b>1607</b>					
Japan SBR Export Value '000Yen/tonne	<b>144</b>	170	180	187	192	<b>182</b>					
France, SBR Export Value €/tonne	<b>1116</b>	1246	1295	1288	1322	<b>1288</b>					

Source: International Rubber Study Group Statistics, on-line, <http://www.rubberstudy.com/statistics-quarstat.aspx>  
SICOM – Singapore Commodity Exchange

Natural rubber prices declined steadily after 1996 and reached a historical low in 2000. While prices have recovered somewhat since then, they are still significantly lower than in 1996. Demand is likely to grow steadily in the current decade, leading to some

tendency towards higher prices. However, price increases tend to be dampened because they promote increased production on the one hand, and increased use of synthetic rubber on the other. (FAO, 2003)



Picture 1 – GYZU, JSc. Gatehouse, authors archive

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Personnel advice and materials granted by Ing. Eva Farkašová, Logistic Assistant Manager and Ing. Jana Havranová, NBC Marketing & Export Manager – by the courtesy of Dr. Pavel Vingrálek, Company Director.

*Received for publication on July 12, 2006  
 Accepted for publication on November 22, 2006*

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