

## **5. Analysis of the Industry and the Structure of Industrial Production in FBiH for the Construction Materials Industry**

### **5.1 Cross-section Data of the State of Production Programs**

#### **5.1.1 State of the Construction Materials Industry**

Until 1992 the construction materials industry employed 11,000 workers and amounted to 1% of the domestic product (according to the data of the Chamber of Economy of the Federation of Bosnia and Herzegovina).

Many years of disruption of production caused by war activities, the loss of the market, the lack of processed materials, the production equipment which is out of order or damaged, and the lack of expert staff resulted in a diminished scope of production, so that the current employment in this sector amounts to approximately 40% of the employment before the war. The war stopped the development, the expansion, and the modernization of this activity.

Processed materials (raw materials) for the production of construction materials (non-metallic mineral products) are mostly of domestic origin (stone, limestone, clay), while the bitumen mixtures (binding materials occurring in natural states or gained through the distillation of oil) are imported.

According to the data of the Chamber of Economy of the Federation of BiH, 1800 companies perform construction works. The following data is registered with the Chamber of Economy of the Federation of BiH, in accordance with the standard qualification of activities (SQA):

- DI/26.40.00. – production of bricks, tiles and similar products – 11 companies
- DI/26.51.00. – production of cement - 2 companies
- DI/26.52.00. – production of lime – 4 companies
- DI/26.61.00. – production of concrete products for construction - 98 companies

- DI/26.62.00. – production of gypsum – 1 company
- DI/26.63.00. – production of concrete mixtures – 12 companies
- DI/26.70.00. – cutting, designing, and processing of stone – 72 companies
- DI/26.82.00. – production of other non-metallic mineral products - 5 companies

Based on the available data of the Federal Bureau of Statistics, the following tables for the field DI/26, according to the SQA, show:

- the achieved production of non-metallic mineral products (Table no. 5.1),
- indexes of industrial production (Table no. 5.2),
- employment (Table no. 5.3),
- average net salary (Table no. 5.4)

**Table 5.1** Achieved production of non-metallic mineral products

Product	U. M.	2004	2005	2006	2007	2007/2006
Quicklime	t	69,342	125,991	142,275	168,831	1,18
Gypsum	t	27,488	29,425	33,227	37,980	1,14
Cement	t	1,044,944	1,025,540	1,226,319	1,283,357	1,05
Elements for bricklaying	000 pcs	157,416	152,277	125,677	*	-
Light construction panels	m <sup>2</sup>	1,673,846	713,616	942,722	*	-
Bitumen	t	344,177	359,734	288,899	*	-

From Table no. 5.1, it can be seen that there is a continuous increase of the production of quicklime, gypsum, and cement. The production of elements for bricklaying, light construction panels, and bitumen is declining compared to 2004 (\*according to the Statistical Yearbook of 2008, the data for 2007 cannot be compared to the previous years due to changes in the units of measurement).

Cement is the basic construction material, both in civil engineering and in building construction. In the Federation of BiH there are two cement factories (TC Kakanj and FC Lukavac) which combined employ around 630 workers. They cover around 70% of the market of BiH, while the rest of the cement is imported, mostly from Croatia.

According to the data of the Chamber of Economy there are 11 companies in the Federation of BiH which produce bricks and brick products. Among the largest are: "IGM"

d.o.o. Visoko, TOP "25 Maj" d.d. Cazin, D.D. "Splonum" Sanski Most, "Termo Ziegel Nigma" d.d. Busovača, Tvronica opeke d.o.o. Sarajevo, and IGM Ciglane Grahovo d.o.o. Bosansko Grahovo.

According to the data of the Chamber of Economy there are five companies in the Federation of BiH that produce stone (cutting, designing, and processing of stone) and products made of stone, those being: A.G. Kamen d.o.o. Široki Brijeg, Dubint d.d. Široki Brijeg, Granitmont d.d. Jablanica, Kamen d.o.o. Bihać, and Granit d.o.o. Jablanica.

Table no. 5.2 shows the index of industrial production – DI/26 – production of other non-metallic mineral products.

**Table 5.2** Indexes of industrial production of non-metallic mineral products

Indexes of industrial production	2004/2003	2005/2004	2006/2005	2007/2006
26.Production of non-metallic mineral products	110.30	101.40	115.10	105.40

Based on the indexes of industrial production of non-metallic mineral products from Table no. 5.2, a growth in production in this sector can be seen.

Table no. 5.3 shows the number of employed persons and the indexes of employment – DI/26 – production of other non-metallic mineral products.

**Table 5.3** Employment and the index of employment of the production of non-metallic mineral products

Employment	Number of employed persons			Index of employment	
	Ø 2006 = 100	XI-2007	XII-2007	$\frac{\text{XII-2007}}{\text{Ø 2006}}$	$\frac{\text{XII-2007}}{\text{XI-2007}}$
26.Production of non-metallic mineral products	4,605	4,957	4,715	102,40	95,50

According to the Statistical Yearbook of 2008 issued by the Federal Bureau of Statistics the number of persons employed in the production of non-metallic mineral products in FBiH in 2007 was 4,861, which is an increase of 5% compared to 2006.

Table no. 5.4 shows the net salary and the index of salaries – DI/26 – production of other non-metallic mineral products.

**Table 5.4** Net salary and index of salaries of the production of non-metallic mineral products

	Net salary			Index of salaries	
Employment	Ø 2006 = 100	XI-2007	XII-2007	<u>XII-2007</u> Ø 2006	<u>XII-2007</u> XI-2007
26.Production of non-metallic mineral products	531,14	579,30	616,97	116,20	106,50

The average net salary in the production of non-metallic mineral products in 2007 was 573.07 KM which amounts to 86.60% of the average net salary in FBiH in the same year.

Based on the data gathered from companies working in the construction materials industry, the Chamber of Economy of FBiH, and the Federal Bureau of Statistics, the following can be observed:

- At this point, the construction material industry in FBiH is facing great difficulties in production. The domestic industry, compared to technologically developed countries, lags behind in the level of technology, productivity, amount of work per unit of production, quality of the product, and profitability. An intensive development of new technologies and production systems which offer a lesser consumption of materials and energy, high accuracy and processing quality, a shorter production time, a high level of flexibility, which all together result in profitable production, is present throughout the world.
- Regarding human resources, companies have troubles with too many employees (technological surplus), the lack of university-educated staff and a bad age structure of the workforce (high share of workers of old age).
- The market of finished products is mostly limited to the area of BiH, while a very small share of the total production relates to export (which, in part, relates to the export of raw materials or primarily processed products). There is also the problem of unfair competition at the market, high salary contributions, and high customs taxes for the import of equipment and processed materials, and the like.
- In a bad economical situation for BiH, the lack of capital investments at the state level (infrastructural objects) results in insufficient construction activities, and thereby also in insufficient usage of construction materials.

### 5.1.2. Survey Data

In order to analyze the existing situation of the construction materials industry a questionnaire was given to the Managing Boards of four companies (firms), and three companies returned the filled in questionnaires.

The list of surveyed companies for the construction materials industry:

1. GRANIT dd - Jablanica
2. TVORNICA CEMENTA KAKANJ dd – Kakanj
3. SIPOREX dd – Tuzla

The surveyed sample is comprised of:

- two companies with 300-500 employees, or a total of 769 employees,
- one company with 101-300 employees, or a total of 187 employees

The structure and assortment of products of the construction materials industry is various and based on the existing raw materials basis and long year tradition.

The production program of processed companies is comprised of the following assortment of products:

- construction elements made of siporex concrete (wall blocks, ballast for floor slabs, floor slabs, wall panels, and others),
- powder products (masonry mortars, tile adhesive),
- light thermal concretes,
- portland cement,
- products made of stone (granite panels, cubes, kerbs)

In the period after the war there was a restoration of damaged and demolished buildings (civil engineering and building construction), and a building of new (business, living) buildings financed mainly by private investors which increased the demand at the construction materials market. The covering of these needs was mainly ensured through import and partially from domestic restored production plants.

The assortment of the production program and the quality of the product was at first influenced mainly by the situation on the domestic market. The quality of the products is satisfactory, although they still, mainly, do not comply with European standards.

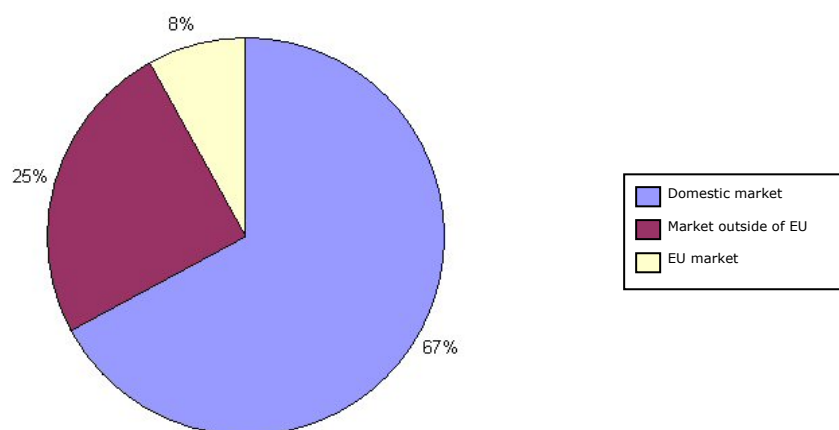
According to the data of the Federal Bureau of Statistics the following Table shows the amount of spending of basic raw materials and materials for the sector of industrial production of non-metallic mineral products. An increase in spending of steel reinforcement for concrete, and cement, as well as a decline in spending of limestone can be observed.

**Table 5.5** Spending of basic raw materials and materials in the industry of non-metallic mineral products

Raw materials	U. M.	2005 (total)	2006 (total)	2007 (total)
Limestone	t	1,200,262	1,175,651	846,728
Steel reinforcement	t	794	2,501	3,494
Cement	t	55,015	78,032	117,430

The analysis of the surveyed companies (this is a statistically small sample so that a conclusion for the whole sector of the construction materials industry cannot be made), shows that finished products are placed at the following markets (Figure 5.1):

- domestic market 67.00%,
- foreign market outside of the EU 25.00%, and
- EU market 8.00%



**Figure 5.1** Market of finished products

Out of all the surveyed companies, only one company (33%) adopted the ISO standard, and no company adopted the CE mark for products, which clearly points to the state in the companies' sphere of organization and hierarchy.

## 5.2 State of Technology and Technological Systems

### 5.2.1 State of Technology until 1992

Basic characteristics of companies in the period before the war (up to 1992) include large numbers of employees, large installed capacities, and production of large series. The companies mostly had a complete production process – from primary to final processing.

However, bad organization, management, and a large number of employees resulted in weaker productivity and efficiency which then resulted in weak financial and overall business indicators.

### 5.2.2 State of Technology Today

Due to the lack of data on today's state of technology for the sector of industrial production of non-metallic mineral products in FBiH, the data presented here is the data gathered during the analysis of the survey questionnaires given to companies.

With the insight into the state of technology and equipment of the surveyed companies, and based on the available data, the following can be concluded:

- None of the three surveyed companies possesses new technology.
- Only one of the companies, which makes 33.00% of the sample, possesses modernized technology.
- Two companies, or 67.00% of the sample, possess old technology.

The utilization of production capacities is around 65.0%. Work in three shifts is organized in two companies, or 67.00%, and in one shift in one company, or 33.00%.

Due to high investments in the modernization of equipment and technology in this sector in FBiH it is necessary to find financing sources or strategic partners in order to modernize production plants and increase productivity which would also ensure a better market position of products at foreign markets.

According to the data of the Federal Bureau of Statistics, Table 5.6 shows the accomplished investments into fixed assets for the sector of industrial production of non-metallic mineral products.

**Table 5.6** Accomplished investments into fixed assets in the production of non-metallic mineral products in thousands of KM

Accomplished investments	2005 (total)	2006 (total)	2007 (total)
DI Production of non-metallic mineral products	56,264	38,435	43,336

The necessary assets for the modernization and revitalization of the equipment and technology for two surveyed companies amount to 89,500,000.00 KM.

### 5.2.3 Status of exploitation of architectural-construction stone

Despite extensive possibilities, production and processing of architectural-construction (decoration) stone in BiH is developed only at a very modest level, and it is reduced to exploitation of a smaller number of deposits located on a few rocks. These are gabbro rocks, different types of limestone and amphibolites.

Before the war in Bosnia and Herzegovina, exploitation and processing of stone was carried out in Posušje, Jajce, Jablanica, Bihać, Sarajevo, Han Pijesak and Foča. Certain regions were ranked as specific and recognizable by indigenous stone.

Today, the exploitation of limestone (sedimentary rock) is carried out on the following deposits: Crveni grm Ljubuški, Česića Draga Posušje, Konjovac Posušje, Hreša Sarajevo, Sadilov Čair Han Pijesak, Maškara Bihać, Divičani Jajce, Nodzre Foča, Ortiješ Mostar. Gabbro, the stone of magmatic origin, is exploited in Jablanica where exploitative resources amount to 800,000 m<sup>3</sup>.

In the period after the war the local stone processing industry achieved only marginal results. Some companies exist with smaller production quantities, and some companies stopped the production. Problems in production and installation of decorative stone are numerous: uncontrolled import, inability to supply the market with different types of stone and different quantities, unprofessional staff, and lack of legal regulations related to technical standards of stones and other problems. However, in the recent period there have been certain positive signs, because there are increasing requests for exploration and exploitation of local stone (Source: Zeljko, T., Zeljko, I.).

### **5.2.4 Financial Indicators**

The total revenue of the surveyed companies in 2006 amounts to: 91,249,298.00 KM, and in 2007 to 118,944,158.00 KM, which represents an increase of 30% compared to 2006.

The amount of the total revenue of the surveyed companies per employee in 2007 is between 22,022.85 KM and 266,942.92 KM. The differences in the amounts are primarily determined by the type of production, the degree of automatization and the achieved degree of modernization and restructuring.

If the share of export in the total revenues is observed, that amount is between 2.70% and 30.2%. The average value of export amounts to 13.3%.

The amount of revenues per employee in 2007 is between 94,106.68 KM and losses in the amount of -18,694.96 KM.

The amount of the net assets per employee could not be analyzed, since the surveyed companies did not provide information.

According to the statistical data of the Federal Bureau of Statistics, the average net salary in the production of non-metallic mineral products in 2007 amounted to 573.07 KM. The average net salary of the surveyed companies in 2007 amounted to 824.06 KM, which is by 43.8% more compared to the average net salary in the production of non-metallic mineral products.

### **5.2.5 Staff Indicators**

The total number of employees in 2007 for the surveyed companies amounts to 956 employees.

According to the statistical data of the Federal Bureau of Statistics the share of university-educated staff in the total number of employees in the production of non-metallic mineral products amounts to around 7.20%.

The share of university-educated staff in the total number of employees in the surveyed companies was between 5.36% and 13.26%. The share of university-educated staff in all the surveyed companies amounted to approximately 8.50% of the total number of



employees. The total number of masters is 2, and there were no persons with a PhD degree among the employees.

The surveyed companies expressed their need for nine new employees with university degrees, mostly referring to graduated construction engineers.

Companies have expressed their problem of technological surplus which affects total production costs, and thereby also the total financial operations of the company.

The average number of those employed coming from the age group of employees younger than 50 years of age, at the surveyed companies, amounts to 54.60 %.

### **5.2.6 Basic Characteristics of the State of the Construction Materials Industry in FBiH**

The basic characteristics of the state of the construction materials industry in FBiH are the following:

1. The basic raw material for processing comes from domestic natural resources,
2. Unsatisfactory ratio of the primary and final processing,
3. Old technology and equipment in the production process,
4. Technological surplus and too much current labor participation,
5. Unfair competition,
6. High prices of energy sources,
7. Impossibility of usage of alternative fuels,
8. High customs taxes for the import of equipment and processed materials,
9. Unsatisfactory export structure,
10. Necessary improvement of the assortment and quality of products,
11. Lack of investments in technological development,
12. Need of finding strategic partners and expansion of the market outside of BiH,
13. Need of larger usage of knowledge,
14. Unsatisfactory participation of university-educated staff in the employee structure,
15. High taxes on salaries,
16. Bad political, legal, and economical framework for development and investments in industry,
17. Inert state administration,
18. Need of creating laboratories for the certification of products in accordance with EN standards,
19. Non-application of ISO standards and CE marks,
20. Need of establishing research development centers,
21. Bad management of the companies,
22. No development strategy.

## **5.3 Possibility of Revitalization and Modernization of Technology**

When determining the strategy and program for the revitalization of the construction materials industry, especial importance should be given to its features:

1. a very high share of domestic raw materials in production,
2. satisfactory primary infrastructure,
3. demand for products dependent on construction production and the scale of construction works, or on the economic activity of the country

Comparative advantages of the construction materials industry (a large share of domestic raw materials) are not enough for further survival and development. Because of that, it is important to work on competitive and export capabilities.

In order to keep up with the modern trends in production and business it is necessary to invest in modern technologies and equipment. With that aim, it is necessary to analyze every company for itself and to define optimal development measures.

Old technology and equipment, weak productivity, surplus of workforce, and the lack of university-educated staff cause bad business results. Since competitiveness of the sector on the market depends on the quality of the product, it can be said at this moment, that the modernization of the production is the precondition for the growth of production, of export, and for the survival at the domestic and conquered foreign markets.

The defining of development guidelines is linked with finding financial sources or strategic partners.

### **5.3.1 Analysis of the Current Capacities and Structure of Production Technology**

In the 1990's large companies stopped working, the infrastructure and technological capacities became old or damaged due to non-usage and non-maintenance. Large companies were not split and privatized in the best manner due to the lack of strategic partners, and markets were lost and a significant lag was created behind highly developed countries regarding development and the monitoring of product quality.

### **5.3.2 Analysis of Current Needs for New Technologies in the Sector of the Construction Materials Industry in FBiH**

In the production of stone products (granite panels, cubes, and kerbs), due to bad technical and technological equipment and technological surplus, production is not economic enough. It is necessary to invest in new technologies in order to make the production more focused on the export of final products than on the export of raw materials and semi-finished products.

Production of construction elements from siporex concrete is performed in compliance with licenses, or technologies which are already old, and modernization has to be carried out to make products more competitive on the market with quality and price.

The technology in the production of cement has been modernized, but there is a need for further modernization of equipment.

## **5.4 Internal and External Constraints (SWOT Analysis)**

In order to understand the external and internal specifics of the sector of the construction materials industry and to identify own, unique competitive advantages, an S.W.O.T. analysis or capabilities analysis was used. The goal of the SWOT analysis is to minimize weaknesses and at the same time increase the strength of the sector, with the best possible use of chances and simultaneous diminishing of threats from the surroundings.

The SWOT analysis (analysis of strengths, weaknesses, opportunities, and threats), as an important segment in the shaping of the strategy, means the defining of internal strengths and weaknesses, as well external opportunities and threats in order to make the best use of the strengths and opportunities and to valorize them, and to neutralize and eliminate weaknesses and threats.

The analysis of external and internal factors tries to objectively identify the internal and external specifics of the sector. The following Table shows the SWOT analysis for the sector of the construction materials industry in FBiH.

INTERNAL FACTORS	<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Satisfactory infrastructure</li> <li>• Industry tradition</li> <li>• Satisfactory assortment of products</li> <li>• Installed production capacities</li> <li>• Energy sources infrastructure</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Unsatisfactory ratio between primary and final processing</li> <li>• Old technology and equipment</li> <li>• High production costs</li> <li>• Technological surplus of workforce</li> <li>• Unsatisfactory participation of university-educated staff</li> <li>• Unsatisfactory export structure</li> <li>• Small application of ISO standards and CE marks</li> <li>• Promotion</li> <li>• Company management and decision-making</li> <li>• Non-existence of development strategy</li> </ul>
EXTERNAL FACTORS	<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Raw materials for processing from domestic sources</li> <li>• Expansion of the market</li> <li>• Workforce market</li> <li>• Usage of capacities</li> <li>• Finding strategic partners and expansion of the market outside of BiH</li> <li>• Building of infrastructural buildings increases the demand for construction materials</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Unfair competition</li> <li>• High prices of energy sources</li> <li>• Government economic policy</li> <li>• Foreign competition</li> <li>• State incentives for production</li> <li>• Ecological demands</li> <li>• Expensive financial assets</li> <li>• Non-existence of quality control and origin of imported goods</li> <li>• Impossibility of usage of alternative fuels</li> </ul>

When choosing the future strategy for the sector of the construction materials industry one should begin with the (redefining of the) mission, the specification of goals, the identification of resources and the shaping of elements.

The analysis of strengths shows that the most important strengths are the installed capacities, the satisfactory assortment of products, and the existence of the energy source and primary infrastructure. What is considered as a weaknesses, are the old

technology and equipment, the surplus of workforce, bad management, and financial operations.

External analysis showed that the most important opportunities are the procurement of basic raw materials from domestic sources, the labor market in the region, and the building of infrastructural buildings which leads to an increase in the consumption of construction materials.

The greatest threat is strong foreign competition, high prices of energy sources, high taxes, the lack of production incentives, and expensive and large financial assets for modernization and future development.

Analyses show that companies from the construction materials industry in FBiH have more weaknesses (W) and more opportunities (O), along with the existence of notable threats (T).

Unfavorable financial terms in the sector of the construction materials industry point to necessary changes and the restructuring of companies. In that sense it is necessary to think about the entry of foreign investments or the finding of strategic partners in order to modernize production (licenses), expand the assortment of products, and ensure the exit to foreign markets.

Taking into account the current state of the companies and the conditions of the surroundings in which they are set, or the results of the S.W.O.T. analysis, changes in the construction materials industry are necessary for an easier adaptation and competitiveness on the market. This includes:

- restructuring of companies,
- stabilization of the financial situation,
- modernization of existing and introducing of new technologies,
- expanding the market and assortment of the production program,
- a higher level of finalization of products,
- lowering the production costs

The development strategy for the sector of the construction materials industry of FBiH has to be comprehensive, with a definition of priorities, visions, and goals which the Government has to accept in order for it to be able to shape economic and legal measures for the realization of the set out strategy, based on them.

## **5.5 Possible Strategic and Development Goals**

In order to make the construction materials industry in line with market and competitive conditions for doing business, it is necessary to set out measures which will enable a faster and more quality development. The measures would be the following:

- defining of the market segment, or target products,
- promotion of the company and joint appearance on the market – export strategy,

- establishing of a system of quality control,
- staff strengthening and training

A marketing mixture is not possible if the approach is not changed from product oriented businesses (there is a product, buyer is sought out and the product is sold at a low price) to a customer oriented production (maximum fulfillment of buyer's wishes).

The defining of the target products should strengthen the competitiveness of the company in order to meet the demands of the buyers and the society with regards to quality and price, which would increase the market share on the domestic market and enable export to foreign markets.

With the constant market research, the enhancement of the production process in order to meet buyer's demands for good design, surface processing, flexible production, and mutual cooperation, with the aim of strengthening competitiveness as well as the forming of an adequate marketing mixture.

With the aim of developing the company's competitiveness, the technology and equipment have to be modernized, modern knowledge and informatics technologies must be applied, all leading to a larger productivity, with a special accent on the enhancement of quality and unique capabilities in order to meet the specified business standards. This would require the following:

- set out European norms and standards,
- set out quality control of imported products as well as the protection of domestic products by introducing EU norms (the measure primarily relates to imported finished products),
- obligation of certificates and attestation (ISO) for production and processes,
- establish adequate institutions for the implementation of quality control of products, which are linked with similar European partners

A faster development is prevented by the undeveloped economic climate and the non-existence of adequate state (legal and economic) incentive measures.

In order to follow modern trends in the development of the construction materials industry, it is necessary to make constant investments in staff training, so that staff which can accept and maintain new technologies and which can work on the enhancement of product quality and the development of new products is created.

The small share of employed university educated staff in the total number of employees (engineers, managers), which could accept the challenges of revitalizing companies, staff for successful marketing, and product promotion is a huge problem. In that sense it is necessary to develop a human resources management department.

It is necessary to introduce a constant and organized system of permanent (specialist) training. Upgrading of workers who are already employed and who perform responsible jobs, but who do not possess the necessary qualifications or knowledge in the sense of accepting new technologies, developing new products, protection on the workplace, and quality management, is very important.

## Bibliography

Federal Bureau of Statistics, FBiH, BiH, *Monthly Statistical Review of the Federation of Bosnia and Herzegovina*, year XII, November, Federal Bureau of Statistics, Sarajevo, 2008

Federal Bureau of Statistics, FBiH, BiH, *Statistical Yearbook of the Federation of Bosnia and Herzegovina, 2008*, Federal Bureau of Statistics, Sarajevo, 2008

Federal Bureau of Statistics, FBiH, BiH, *Statistical Yearbook of the Federation of Bosnia and Herzegovina, 2007*, Federal Bureau of Statistics, Sarajevo, 2007

Federal Bureau of Statistics, FBiH, BiH, *Statistical Yearbook of the Federation of Bosnia and Herzegovina, 2006*, Federal Bureau of Statistics, Sarajevo, 2006

[www.kfbih.com](http://www.kfbih.com) Access: July, 2008

