



11–12 October 2012, Riga

**Riga Technical University
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Scientific Conference**

Dedicated to the 150th Anniversary and
The 1st Congress of World Engineers and
Riga Polytechnical Institute / RTU Alumni

DIGEST

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Table of contents

| | |
|---|-----|
| <u>Computer Science</u> | 3 |
| • Boundary Field Problems and Computer Simulation | 3 |
| • Technologies of Computer Control | 20 |
| • Applied Computer Systems | 41 |
| • Information Technology and Management Science | 66 |
| <u>Power and Electrical Engineering</u> | 98 |
| • Power Engineering..... | 98 |
| • Electrical Machines and Drives, Robotics | 107 |
| • Power Electronic Converters and Applications | 118 |
| • Process Control | 131 |
| • Environmental and Climate Technologies..... | 137 |
| <u>Materials Science and Applied Chemistry</u> | 183 |
| • Materials Science..... | 183 |
| • Chemistry and Chemical Technology..... | 217 |
| • Textile and Clothing Technology | 278 |
| <u>Humanities and Social Sciences</u> | 304 |
| <u>Architecture and Urban Planning</u> | 331 |
| <u>Construction Science</u> | 359 |
| • Construction Science | 359 |
| • Heat, Gas and Water Technology | 407 |
| • Geomatics | 436 |
| <u>National Economy and Entrepreneurship</u> | 451 |
| • Scientific Problems of Technogenic Environment Safety | 451 |
| • International Business, Logistics, Customs and Taxes | 463 |
| • National and Regional Economics..... | 478 |
| • Production Economics, Finance and Marketing | 514 |
| • Quality Technologies and Management | 569 |
| <u>Technology Transfer and Innovation</u> | 577 |
| <u>Engineering, Mechanics and Mechanical Engineering</u> | 581 |
| • Production Engineering | 581 |
| • Heat Power and Thermal Physics | 597 |
| <u>Transport</u> | 606 |
| • Road Transport | 606 |
| • Railway Transport | 609 |
| • Aeronautics and Transport Systems | 619 |
| <u>International Symposium on Biomedical Engineering and Medical Physics</u> | 639 |
| <u>Real Estate Economics and Construction Entrepreneurship</u> | 740 |

Applications of Electromagnetic Conveying System in Powder Metallurgy Industry

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Keywords – electromagnetic conveying, ferromagnetic powder, powder metallurgy, dispensing.

I. INTRODUCTION

Over the last few years, in Riga Technical University a new approach for conveying of ferromagnetic powder materials has been developed. In the Laboratory of powder materials of Riga Technical University an experimental low-voltage electromagnetic conveying system EMC-05 has been developed [1]. The process is based on interaction between ferromagnetic materials and impulse electromagnetic field. The designed equipment has been used for development of laboratory testing of different powder materials, as well as for process parameters optimization.

II. PRINCIPLE OF CONVEYING AND EXPERIMENTAL EQUIPMENT

Process of powder conveying can be expressed as a displacement of the determined centre of mass under the influence of pulse pressure (Figure 1).

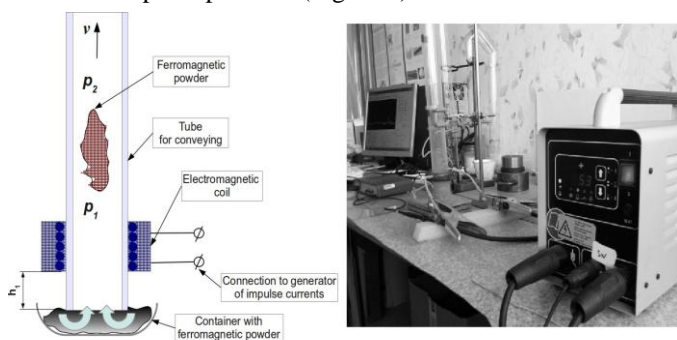


Figure 1. Experimental electromagnetic conveying system EMC-05 (Laboratory of powder materials, RTU).

Main parameters of experimental conveying system are shown in Table 1.

TABLE I
MAIN PARAMETERS OF RTU EMC-05 LABORATORY-SCALE
ELECTROMAGNETIC CONVEYOR

| Parameter | Value |
|---|---------------|
| Capacitance of generator of impulse currents, μF (F) | 66000 (0.066) |
| Max discharge energy, J | 1600 |
| Impulse duration, ms | 1.0-5.0 |
| External diameter of conveying tract, mm | 50 |
| Length of conveying tract, mm | 2000 |

III. EXPERIMENTAL PART: CONVEYING, DISPENSING, MIXING.

Using an experimental conveying system EMC-05, a variety of possible applications have been investigated (Figure 2.).

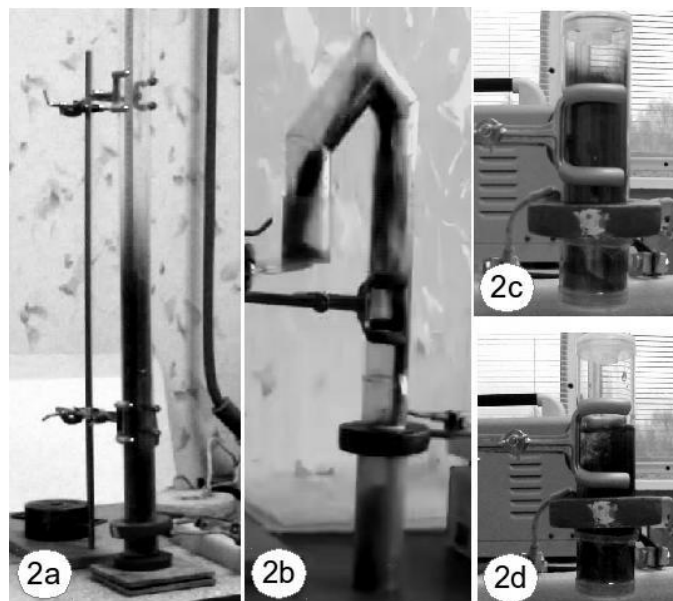


Figure 2. Conveying of ferromagnetic powders in vertical pipe (Fig. 2a), dispensing system for ferromagnetic powders (Fig. 2b), mixing of ferromagnetic powders in the air (Fig. 2c) and aqueous (Fig. 2d) environments.

IV. POSSIBLE APPLICATIONS OF TECHNOLOGY

- Powder metallurgy manufacturing plants.
- Manufacturing of powder metal components.
- Chemical plants, where mixing or dosing are needed.
- Feeding systems for production of ferrous fiber.

V. CONCLUSIONS

A developed experimental conveying system can be used as a prototype for further pilot equipment design.

A perspective industrial application of electromagnetic conveyors is a vertical transportation device for ferromagnetic powder materials [2].

VI. ACKNOWLEDGEMENTS



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VII. REFERENCES

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