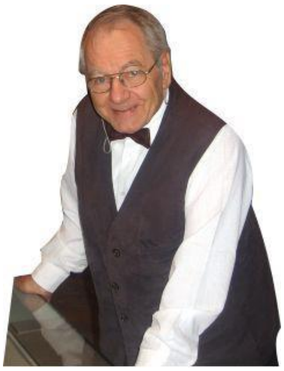
Sand Texture Sedimentology — Field of the Future

Dear Friends,



Some of you belong to this category of human relationships. Others — colleagues and similarly interested persons — please consider it as my trust to my Life Project. Do not lose time by doubting: please help me in supporting this project.

60 years ago — soon after I started studying sand sediments, I found that the granularity studied by the methods and knowledges of that time was seriously flawed. I went back to the roots, found the reasons, and, as a consequence, I started developing appropriate instrument, which I later called Sand Sedimentation Analyzer™. Similarly, the higher moments did not characterize distributions and had to be replaced by Gaussian components (I discovered the suitable program for distribution decomposition later). Instead of particle size, particle settling rate should be used as independent variable.

My most important research was initiated in the period from 1968 – 1971 while in Germany at the *Institut für Mechanische Verfahrenstechnik,* Karlsruhe, under Prof. Dr.-Ing. Hans Rumpf. Thereafter, I continued self-employed near Heidelberg, assisted by Mr. Werner Filsinger. I financed my basic research of sand texture sedimentology and instrumentation by commercial applications. About every year, I produced and sold a new prototype. Between 1971 and 2000, I developed overall 20 different Analyzers™ http://www.granometry.com/index.php/en/users/product-users .

It is common knowledge that sands are of great economic importance. The mobility of recent sands, for example, affects the recreational use of beaches, the safe navigation depth of channels by supertankers etc.. Furthermore, the highest quality of oil, natural gas and heavy mineral resources (gold, platinum group, rare earth minerals, zircon, diamond, tin and titanium oxides, garnets, abrasives) are hosted in the sands and sand texture sedimentology will help finding them.

Project Support

Please support this project: it will eliminate the more than half century errors and provide a unique method to experts.

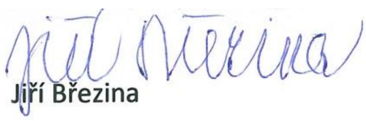
Your contribution:

- 100 € — certificate of your project support
- 1000 € — partner participation on the realization according to our agreement
- 10,000 € — individual wishes
- 100,000 € — individual wishes

Participation on Realization

Become a member of my team. Already now you may learn the extent of my project on my web http://www.granometry.com and find the field of your interest. After the project finalization, I will gladly analyze your samples, assist with the result interpretation, and explain your questions.

Thank you — today (April 6, 2017) I am 84. My genes are OK – my cousin Marta reached 100 years on the November 14, 2016. I am looking forward to your opinion.



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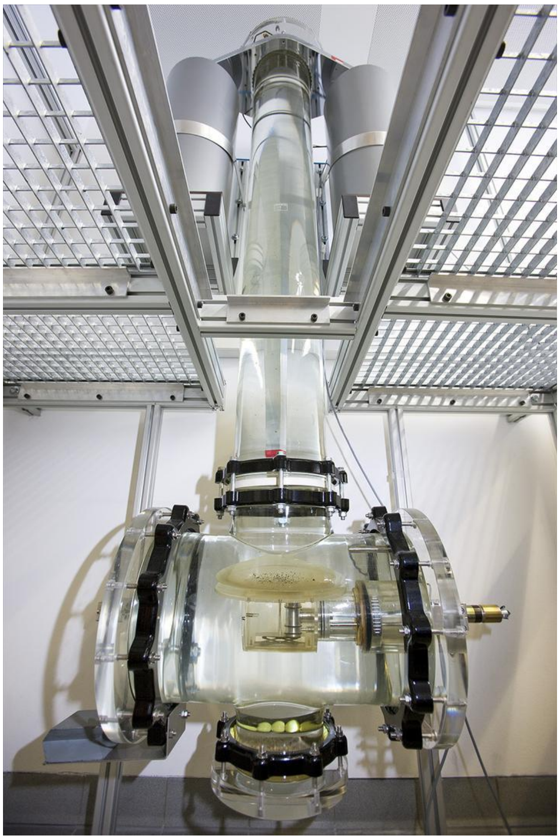
Principles of Sand Texture Sedimentology

As sand settles rapidly, analysis and separation take only a few minutes; the finest sand particles (50 µm) take up to about 15 minutes to settle through the 180 cm high water column.

Sand Texture Sedimentology shows:



1. Sand is the most suitable size range, as it is transported and deposited in the transitional laminar – turbulent flow regime;
2. The settling rate rather than the grain size should be the distribution independent variable;
3. Only Gaussian distribution components (not parameters from higher moments) characterize and identify the measured distribution; my SHAPE™ program calculates 1-5 components (populations); samples from individual laminae maintain Gaussian components even when mixed;
4. My universal sedimentation equation merges Stokes' and Newton's laws, extends them to non-spherical particles, and enables conversion to any variable: size, shape, density and settling velocity of particles in any fluid at any temperature and any gravitational acceleration;
5. I experimentally determined the optimum particle concentration for collective sedimentation, in which each particle settles without the influence of others — as if they were settling alone. It is therefore necessary to analyze appropriately small samples in dependence of grain size. Due to the large grain numbers, such samples are representative. Their preparation requires careful splitting, preferentially by means of a *rotary* divider. Only such small samples guarantee the precise measurement of their settling rate. My Analyzer™ was specifically developed for small samples.

Analyzer™

Settling analysis of sand has been applied since the year 1937, but the cheap solutions were based of incorrect concepts. At first, a homogeneous sedimentation in a narrow tube was sensed visually. Using even stratified sedimentation since 1960 was sensed by a suspension density and thus required high particle concentration, which caused serious errors. I avoided these mistakes by sensitive particle weighing: my Analyzer™ therefore always measured correctly and precisely. The most important principles:

1. Stratified sedimentation (into a clean liquid) saves one measuring derivative — increasing the accuracy by one level. In this sedimentation, the particle concentration decreases with time (it increases in homogeneous sedimentation).
2. I mathematically defined the maximum particle concentration, i.e. the maximum sample: for the inner diameter of my settling tube (20 cm), 18,000 particles (their mutual distance is 3.4 mm at least). Depending on the grain size, sample weight varies from 0.05 to 5 gram. This also satisfies the requirement of representative grain number in samples.
3. I quantitatively introduced samples into my settling tube with minimized initial density streaming by sample introduction (the vibrating eccentrically mounted concave Venetian blind lamellae).
4. To measure the settled mass of such small samples correctly and accurately, I developed a very sensitive and fast underwater electronic balance, which resolves 0.01 percent of both large and small samples (5 to 0.1 gram), within 26 milliseconds. The highest resolution guarantees the highest signal/noise ratio, reducing environmental vibrations by pneumatic damping.
5. A special construction of the balance springs (J. Brezina, 1972, German patent č. 2251838) eliminates a distortion from asymmetric balance pan load.

Separator™

As in the case of the Analyzer™, it utilizes the same settling tube (without pneumatic damping) with the Venetian Blind™, but, the Underwater Balance™ is replaced by a Separation Unit, in which a flushing water circuit transports the separated fractions into 25 (or more) funnels with porous bottom.

1. The Separation Unit is placed at the bottom of the settling tube. Its two tilted conveyor belts move the sediment into one of two alternating chambers, from which the fractions are flushed out of the settling tube into one of the 25 collectors. All actions are controlled with millisecond accuracy.
2. The uniqueness of the Separator™ is not only in its construction, but also application. If one narrow size fraction is separated into settling rate fractions, these correspond to density fractions, for example, heavy minerals and porous microfossils (*Foraminifera*). This separation is much more exact than by any other method, e.g. separation by heavy liquids (most of which are toxic). Microfossils are not separable by heavy liquids, but are traditionally separated manually under the microscope.
3. The separation is quantitative – no particles are lost.

Current Equipment

1. Frequency (5 kHz) amplifiers by HBM, Darmstadt (3 each)
2. Glass sedimentation columns (2 each) with 2 pneumatic shock absorbers
3. 16 VECO sieves of pure nickel (7 cm diameter) with circular holes, accuracy ±2µ
4. RETSCH rotational sample splitter 1:8, model PT, with vibratory sample supplier
5. Glass spherical container (for 100 liter distilled water)
6. KERN analytical electronic balance, model ABJ-BA-defsin-0212 (0.1 milligram resolution)
7. Important parts of SEPARATOR™, such as 2 step-motors, 2 electric valves, flushing water tank.

Main Tasks

1. Apartment for the new LAB in Praha, Czech Republic
2. Moving of the current equipment from Germany to the new LAB in Praha, Czech Republic
3. Updating the Venetian Blind with light injection made plastic lamellae: CAD drawings and production
4. Updating the underwater balance: CAD drawings and production
5. Updating the automatic 5kHz frequency measuring amplifier of HBM, Darmstadt
6. Updating the electronic circuitry controlled by Strawberry PI microprocessor in MS Windows
7. Updating the controlling, measuring and data processing programs
8. Program for commercial analyses of shipped samples, internet results delivery and payment (e-shop).

The implementing costs of the above tasks are about US $150,000 .

Correct and accurate measurement and replacement of the higher moment parameters by Gaussian components will change the post-war failure of the ill-conceived studies into success. This will be demonstrated by specific applications, e.g. by the sedimentary basin analysis and the use of the Gaussian components as natural tracers for the sand motion reconstruction and origin (provenance and transport direction).

The main application of the Sand Texture Sedimentology is in geology, oceanography, forensic analysis, and planetology.