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by Sagwell

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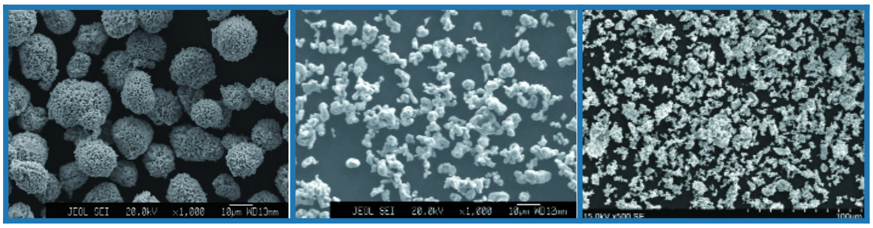
Sagwell produce micro polveri metalliche di alta qualità con un metodo innovativo. Le polveri di ferro sono caratterizzate da granulometria molto fine, elevata area superficiale, bassa temperatura di sinterizzazione, prestazioni stabili e una struttura uniforme.
La resistenza a flessione e il grado di densificazione possono essere paragonate alle formulazioni con alto contenuto di cobalto e sono in grado di soddisfare le necessità legate alla riduzione dei costi e al miglioramento delle prestazioni nella produzione di utensili diamantati di alta qualità.
Le polveri di ferro Sagwell presentano diversi vantaggi rispetto alle polveri di ferro carbonile, quali costi di produzione più bassi e processi produttivi sicuri ed ecologici.
Inoltre, grazie ad una morfologia irregolare, queste polveri di ferro offrono buoni risultati in termine di compattazione. La loro granulometria è simile a quella delle polveri di ferro carbonile ma in più offrono una maggiore fluidità e possono essere utilizzate con una temperatura di sinterizzazione più bassa.
Rispetto alle polveri di ferro ridotte, le polveri Sagwell hanno una granulometria molto più fine, una fluidità più elevata e migliori caratteristiche meccaniche, per cui si può ridurre sensibilmente la temperatura di sinterizzazione e migliorare il processo di alligazione.
Le polveri di ferro superfini di Sagwell sono state utilizzate con successo nella produzione di utensili diamantati per la lavorazione della ceramica e sono ampiamente riconosciute, a livello mondiale, per le loro eccellenti prestazioni, tanto che negli ultimi 20 anni sono molti i produttori di utensili diamantati ad averle richieste.
Grazie alla vasta gamma di polveri di ferro caratterizzate da purezza, lunga durata, assenza di cobalto, basso contenuto di nickel, rame e stagno, Sagwell è in grado di soddisfare le diverse esigenze dei clienti rendendo i loro prodotti più competitivi.



4. Sagwell metal powder can be widely applied to PM, diamond tools, environmental remediation, electronic components and other industries.
Sagwell produces high quality micron scale metal powders by innovative method so iron powders have the characteristics of fine size and narrow distribution range, high specific surface area, low sintering temperature, stable sintering performance and uniform sintering structure.
Its bending strength and densification degree can be comparable with that of high cobalt based formulation and can meet the needs of cost reduction and improvement in performance in the production of high-grade diamond tools.
Sagwell iron powder has several advantages over carbonyl iron powder such as lower production cost, safe and green production process, besides with irregular and hammer-shaped morphology, the iron powder has good compaction performance.
Meanwhile, the particle size of Sagwell iron powder is similar to that of carbonyl iron powder, it also has the characteristics of high activities and low sintering temperature.
Compared with reduced iron powder, Sagwell iron powder has much finer particle size and higher activities, which can efficiently reduce sintering temperature and improve alloying level, and its mechanical performance is better.
Sagwell's superfine iron powder was first successfully applied to diamond tools for ceramic processing, and was widely recognized for its excellent performance and has been used by many diamond tool factories worldwide in the past 20 years.
By designing a high iron-based formulation system of high sharpness, long life, cobalt-free, low nickel, low copper and low tin, Sagwell provides choice of various powders to meet the needs of different customer and makes their products more competitive.

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Euro PM2018 Congress & Exhibition basks in a successful Bilbao event

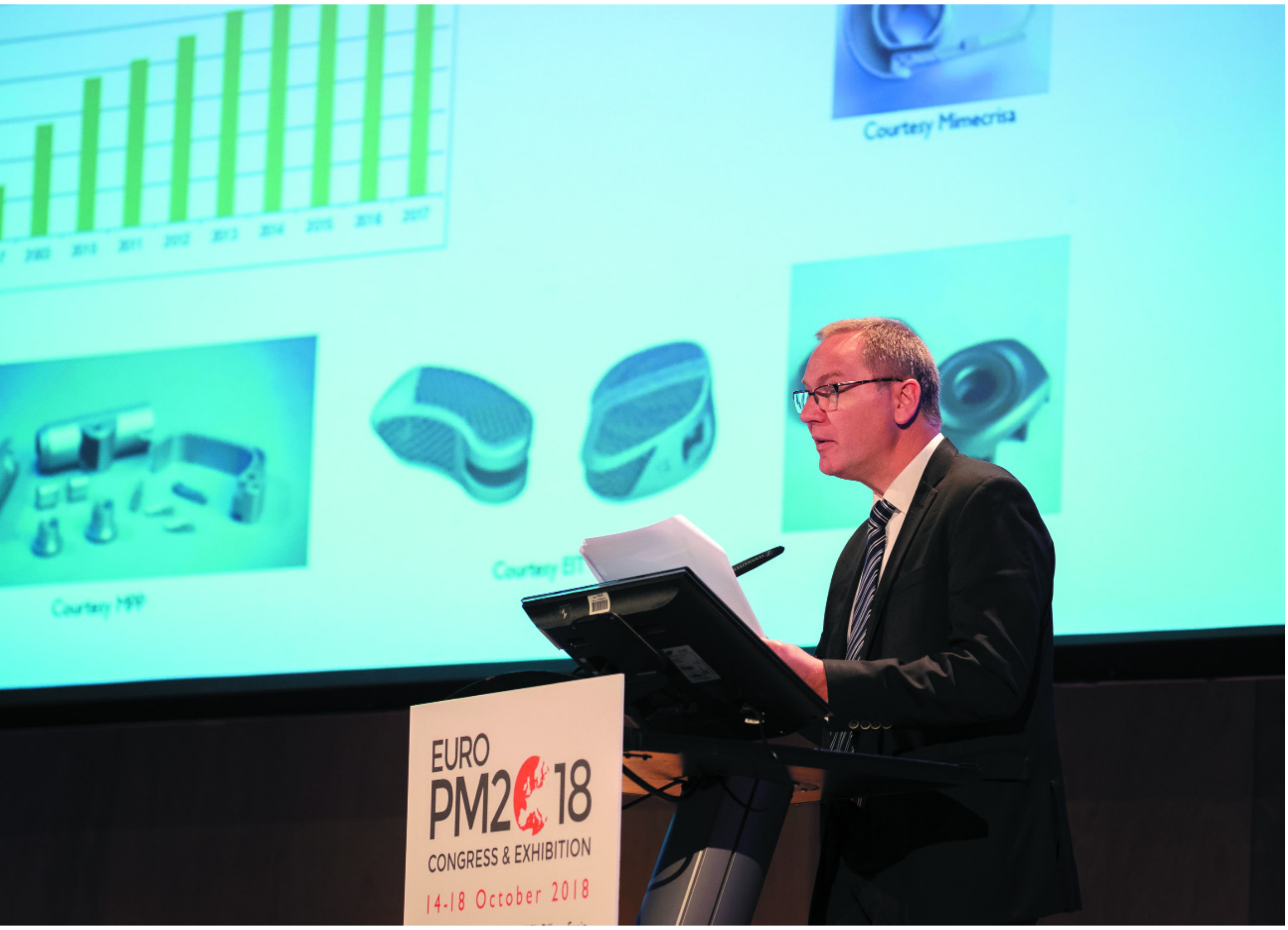
Bilbao, the capital of the Basque Country in northern Spain is well known for its Frank Gehry designed Guggenheim Museum that helped in the revitalisation of the once industrial city to be the cultural location it is today.

In the PM circles, Bilbao will also be known as the host of this year's Euro PM2018 Congress & Exhibition, 14-18 October 2018. The annual Euro PM Congress & Exhibition, organised and sponsored by the European Powder Metallurgy Association (EPMA) created an international location for participants to discuss, develop and distribute the latest industry trends and techniques that the powder metallurgy sector has to offer.

Following on from last year's successful Euro PM Congress & Exhibition in Milan, this year's expanded event has continued to draw international participants with no less than 51 countries represented at this year's event with participants attending from across the globe, including the Far East, Africa and the Americas.

The interest in Euro PM2018 has meant that it held over 300 Oral and Poster presentations with a strong attendance in excess of 1100 participants.

Dr Olivier Coube, EPMA Technical Director, said "The Euro PM2018 represents a turning point of our annual Congress & Exhibition in terms of size with 50% more presentations vs 2017, including 40% Metal Additive Manufacturing contents, and at the same time an enlarged programme for the historical PM technologies, which still are the backbone of our industry. I would like to especially acknowledge the work of the EPMA staff as they have made this change of dimension logistically possible. One month after the World PM event it was a risk, it was hard work but at the end it was a success with approximately 20% more delegates than last year".



Running in parallel to the technical sessions was the Euro PM Exhibition, which contained over 100 booths representing companies from all parts of the PM supply chain. This year's Euro PM Exhibition has again raised the bar for the number of companies exhibiting at a Euro PM event making it the largest Euro PM Exhibition to date.

Lionel Aboussouan, EPMA Executive Director said "Bilbao was a great location and made for a thriving event. The enlarged technical programme and extended exhibition opening times helps to attract a diverse range of companies and sectors that want to learn more about what PM can do for their applications and industries. We would like to thank all the EPMA supporters and stakeholders who have assisted in making this event a success!"

Philippe Gundermann, EPMA's President, opened the plenary session with an 'Overview of the Status and Trends in the European PM Industry'.

This was followed by a welcome from the Congress Co-Chairman Mr Manel Pérez Latre who provided a brief overview of PM production and evolution in Spain.

The Technical Programme Committee Chairs, Prof Francisco Castro (CEIT, Spain) and Prof Herbert Danninger (Vienna Technical University, Austria) thanked the work of all the technical program committee members who reviewed over 350 technical papers.

Lehendakari Iñigo Urkullu Renteria, the Basque President, officially opened Euro PM2018 and provided a welcome to the Basque Country. Mr Borja Arenaza Latorre, Director of Advanced Manufacturing at Sisteplant, Spain presented about 'Big Data in Industry 4.0', followed by Mr Frank Schlehuber, Senior adviser Aftermarket, CLEPA, Belgium, who presented about 'The Future of the Automotive Supply Industry'.

Following on from the keynote speakers was the annual EPMA Thesis Competition with winning theses from:

❒ Doctorate category - Dr Thomas Lapauw, KU Leuven, Belgium 'Mn+1 AXn phase-structured carbides for nuclear applications';

❒ Masters category - Dipl-Ing Kevin Ouda, TU Wien, Austria 'Determination of retained austenite in differently

Alloyed Steels By Magnetic Measurements'.

The EPMA Board and Council's Fellowship Award helps to recognise the significant contribution to PM industry development from the scientific/academic community. The EPMA Fellowship Award not only provides a fantastic recognition from the PM community for such tremendous work, but also looks to exemplify the continued involvement in PM science and technologies.

The EPMA 2018 Powder Metallurgy Component Awards also featured highly in the opening session with the following companies taking first place in their respective category:

❐ Additive Manufacturing category - Rosswag GmbH, ForgeBrid®;
❐ Hot Isostatic Pressing category - Framatome/Aubert & Duval, NNS Reactor Coolant Pump Impeller;
❐ Metal Injection Moulding category - AMT PTE Limited, One Piece Nozzle;
❐ PM Structural category - Gervorkyan, SRO, Driving Flange.

The following companies were Highly Commended in their respective categories:

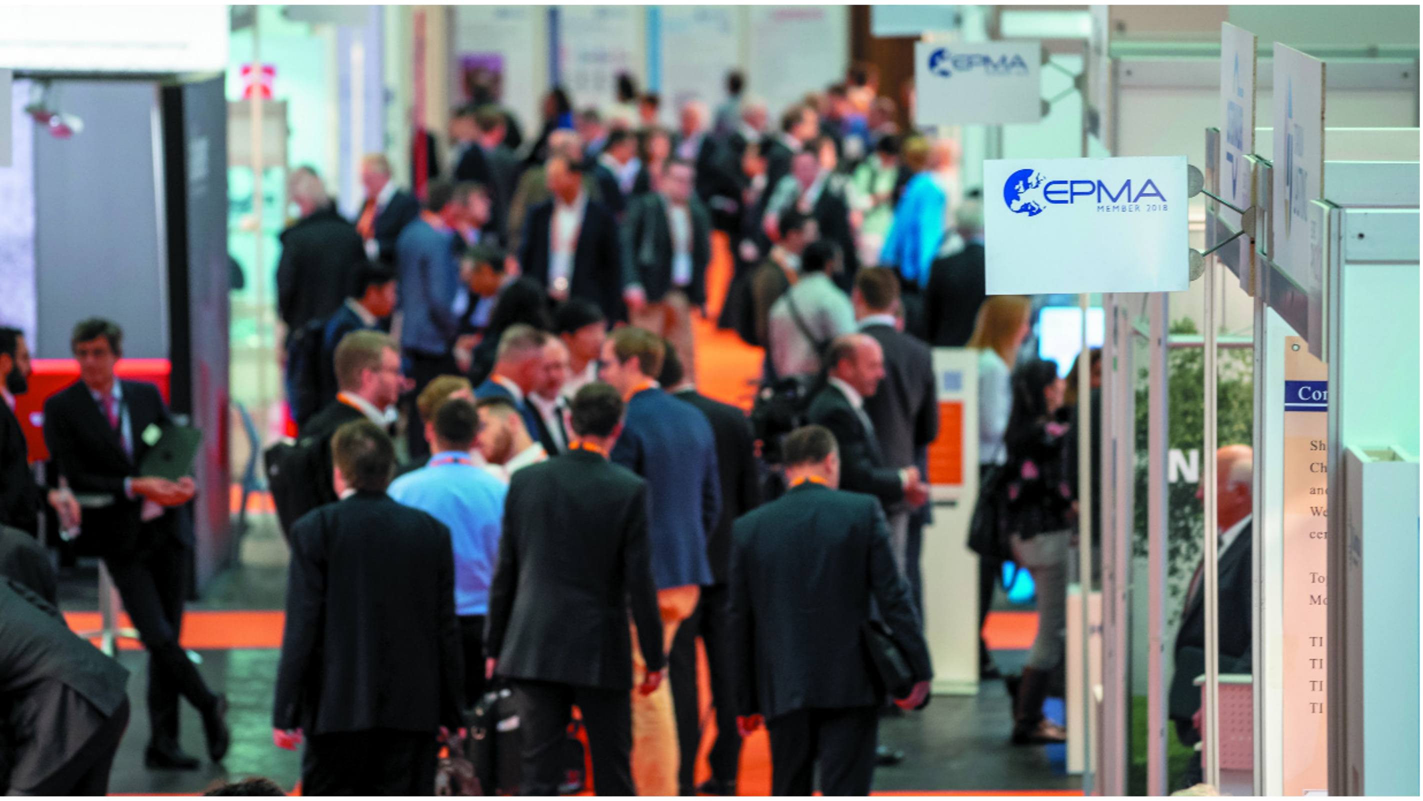
❐ Additive Manufacturing category - University of West Bohemia, Regional Technological Institute, Kraken, Special Light Milling Head;
❐ Metal Injection Moulding category - Schunk Sintermetalltechnik GmbH, HPC-Vane;
❐ PM Structural category - ASCO Sintering Co, Lock Bolt.

For the fifth successive year the EPMA's Young Engineers Day enabled students from five Universities to attend the Euro PM event and gain an understanding of what a career in the PM industry can offer undergraduates through an intensive 2-day programme.

The Congress Dinner on the Wednesday evening gave attendees a unique opportunity to experience a 45-minute concert from the world famous Orfeon Donostiarra, before enjoying a seated meal in the Jauregia restaurant.

Euro PM2018 gave the opportunity for the range of EPMA's Sectoral Groups to hold their meetings alongside the technical sessions.

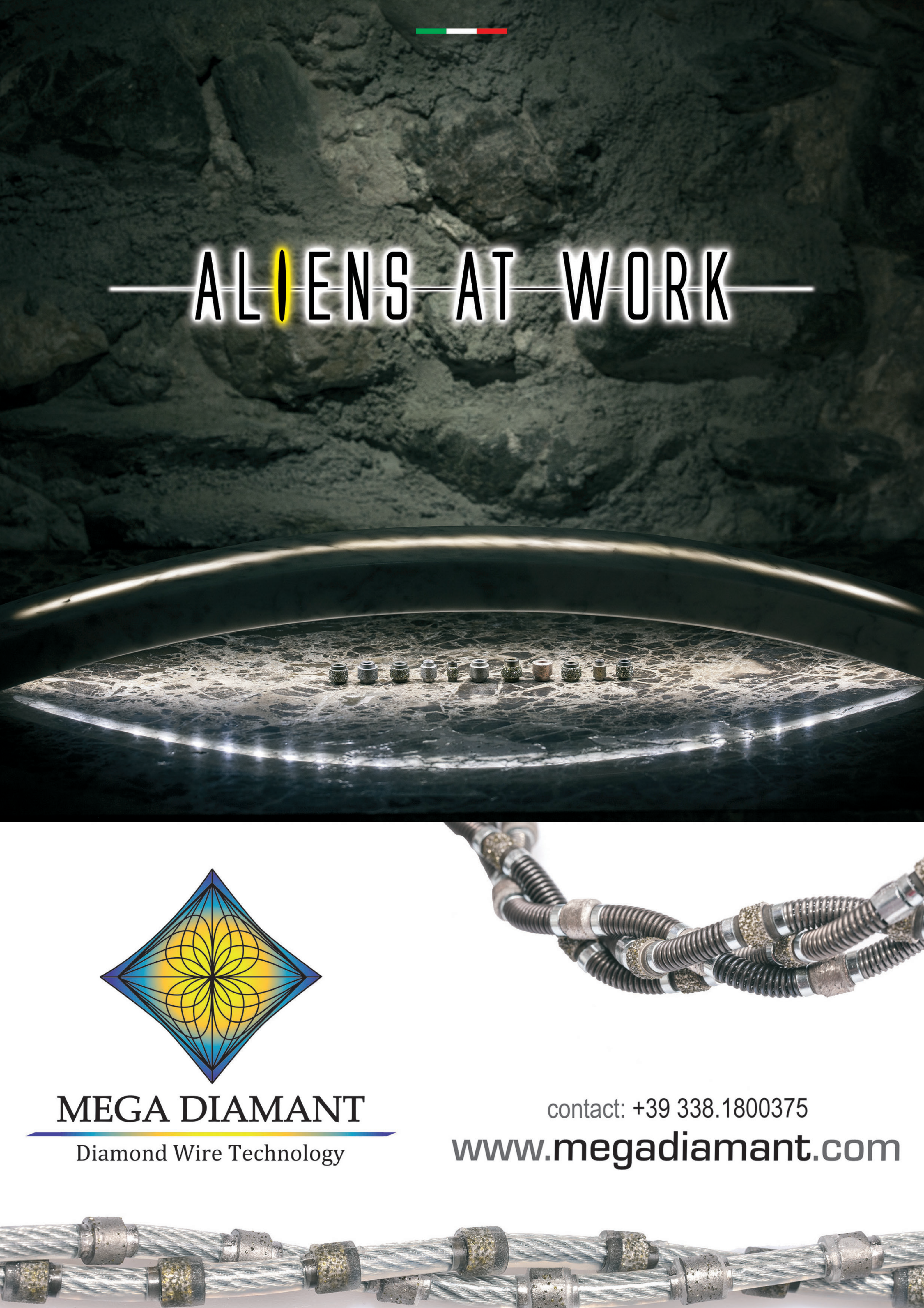
The EuroAM celebrated its 5 year anniversary with a packed session on new and innovative AM related processes, a review of the past and future works and challenges for the group and the third Metal AM Trends Survey.



The EuroHM invited keynote speakers to give an update of the growing Spanish Hard Material community.
The EuroPress&Sinter used its session to foster the discussion on the possible ways to improve the technology and the synergies between Industry and Academia.
EuroHIP and EuroMIM also had meetings taking place during the event schedule.
A new Functional Materials Sectoral Group - EuroFM was established, off the back of the 2018 Functional Material seminar held in Jülich, Gemany earlier in the year, and will help represent materials that are used in functional applications, such as electric cars/battery systems.
The technical programme also included strand relevant Special Interest Seminars that covered the following topics:

❒ Additive Manufacturing - Success Case Studies in Production and Future Preview of Metal AM;
❒ Hard Materials - Micromechanical Testing of HM;
❒ Hot Isostatic Pressing & Additive Manufacturing - HIP and Heat Treatment of AM Parts - Microstructure and Mechanical Properties and the Effect of Combined HIP and Heat Treatment Cycles Compared to Conventional Processing;
❒ Metal injection Moulding - Quality and Tolerances of MIM components & Functional Materials: Soft and Hard Magnetic Materials;
❒ PM Structural Parts - A Critical Analysis of the Press & Sinter Technology.

A 'PM for Beginners' session by Prof. Dr. Lorenz Sigl was presented to some 50 participants who wanted to learn more about the basics of powder metallurgy.
The 90-minute presentation looked at the key topics of powder metallurgy, including the variety of materials, processes and applications covered by the PM industry today.
In a first for a Euro PM Exhibition, the exhibition opening time on Monday morning was moved forward to 9 am, to allow for increased networking opportunities, between exhibitors and visitors.
Work is already in progress on next year's Euro PM2019 Congress & Exhibition, to be held in Maastricht, 13 -16 October 2019, which will also help to celebrate EPMA's 30th Anniversary.
For further information on either Euro PM Event or to receive information on future EPMA events please contact the EPMA Secretariat.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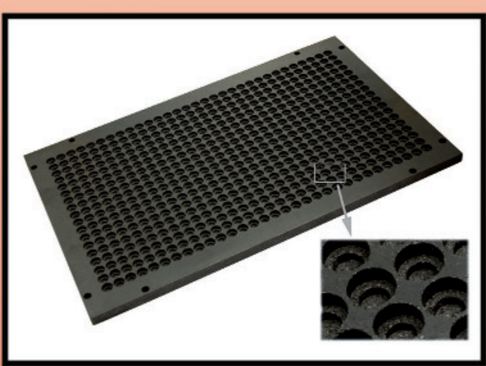
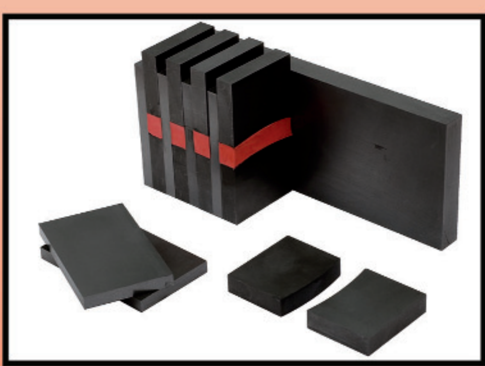


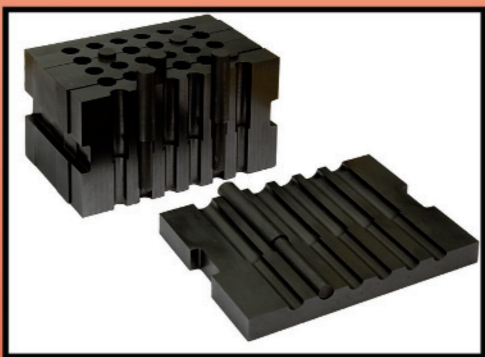


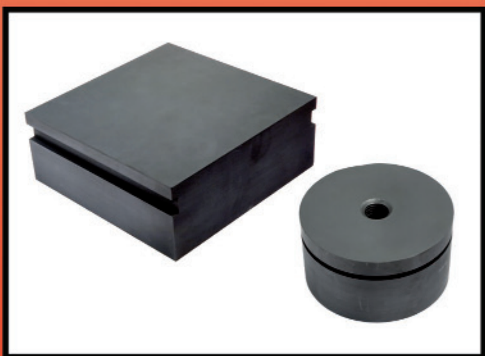


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Effetto delle condizioni di lavorazione sulla stabilità del diamante durante la produzione di utensili diamantati

di N.G. Polvorosa [1, 2], G. Peña [1], C. Luno-Bilbao [1, 2], I. Iturriza [1, 2]
[1] Ceit, Donostia/San Sebastián, Spagna
[2] Tecnun, Università di Navarra, Donostia/San Sebastián, Spagna

ABSTRACT

La capacità di taglio degli utensili impregnati di diamante (DIT) dipende principalmente dall'interazione tra diamante e legante. Le particelle di diamante sono il vero elemento tagliente in un DIT e devono essere trattenute dal legante senza che si presentino fenomeni di degradazione/grafitizzazione derivanti da un'eccessiva interazione.
Durante la produzione, le condizioni di processo potrebbero rivelarsi problematiche per la stabilità del diamante. Maggiori sono il contenuto di Fe nel legante e la temperatura/tempo di lavorazione, maggiore è la probabilità di ottenere una reazione tra diamante-legante.
Due diverse polveri ricche di Fe sono state miscelate con quattro tipi di diamante (tre rivestiti) e, successivamente, pressate a freddo e sinterizzate mediante hot-pressing e sinterizzazione libera. I risultati sono stati analizzati in termini di caratteristiche della polvere, stabilità del diamante, microstruttura, flessione a tre punti, durezza, ritenzione e friabilità del diamante.
Le differenze riscontrate sono state significative, partendo da una interazione trascurabile per arrivare ad una parziale grafitizzazione, con aumento della friabilità e degradazione della superficie. Il rivestimento in Cr è risultato essere il più efficace rispetto a quello in Ti nella protezione dei diamanti.

1. INTRODUZIONE

Gli utensili diamantati sono una delle applicazioni più importanti della metallurgia delle polveri (PM).
Milioni di componenti impregnati di diamante (DIC) vengono prodotti ogni anno con diverse tecnologie metallurgiche, per la lavorazione della pietra e per l'ingegneria civile [1-4]. Questi componenti sono, di fatto, materiali compositi, in cui delle particelle di diamante relativamente grandi sono incluse in una matrice metallica.
Le polveri prelegate (PA) per utensili diamantati sono disponibili sul mercato dal 1997 e, attualmente, hanno ottenuto un posizionamento significativo [7].
La prima generazione di polveri prelegate, basate sul sistema Fe-Co-Cu, è stata progettata per sostituire il cobalto nei componenti stampati a caldo ed ha mostrato un'adegua-

Effect of the processing conditions on the diamond stability during the production of diamond impregnated tools

by N.G. Polvorosa [1, 2], G. Peña [1], C. Luno-Bilbao [1, 2], I. Iturriza [1, 2]
[1] Ceit, Donostia/San Sebastián, Spain
[2] Tecnun, University of Navarra, Donostia/San Sebastián, Spain

ABSTRACT

The cutting ability of Diamond Impregnated Tools (DIT) depends strongly on the diamond-bond interaction.
Diamond particles are the real cutting element in a DIT and need to be retained by the bond without degradation/graphitization by an excessive diamond-bond interaction.
During production, processing conditions could be an issue for diamond stability. The higher the Fe content in the bond and processing temperature/time, the higher the probability of diamond-bond interaction.
Two different Fe-rich powders have been mixed with four diamond grades (three of them coated) and subsequently cold-pressed and sintered by hot-pressing and free-sintering. Results have been analysed in terms of powder characteristics, diamond stability, microstructure, three-point bending, hardness, retention and diamond friability.
Significant differences have been found from negligible interaction to partial graphitization, increase in friability and surface degradation, with the Cr coating more effective than the Ti coating in protecting diamonds.

1. INTRODUCTION

Diamond tools are one of the most important applications of Powder Metallurgy (PM). Millions of diamond impregnated components (DIC) are produced every year by different powder metallurgical technologies for stone processing and civil l'aumento della loro friabilità.

❒ Legante PA:

❍ FS: per tutte le tipologie di diamante l'interazione aumenta rispetto alle PMP-FS e anche F è più alta. Solo per i non rivestiti si vede un numero significativo di diamanti macrofratturati. Per le tipologie rivestite l'interfaccia più debole è tra il rivestimento e il diamante. La ritenzione è compresa tra quelle di PMP-FS e PMP-HP.

4. CONCLUSIONI

La stabilità delle particelle di diamante negli utensili impregnati di diamante (DIT) dipende sia dalle caratteristiche del legante che dalle condizioni di lavorazione.
Le polveri metalliche, anche se a base ferro, mostrano una reazione limitata con il diamante se sono sinterizzate con sinterizzazione libera e la densificazione è bassa.
L'introduzione di processi di sinterizzazione con pressione assistita, come l'hot-pressing, aumenta la densità e, sebbene il tempo di permanenza ad alta temperatura sia molto più breve, aumenta anche l'interazione del diamante.
Nella sinterizzazione libera le polveri che sono più attive (più fini) sono in grado di raggiungere una densità più elevata rispetto a quella che si ottiene con le polveri grossolane e, di conseguenza, generano anche una maggiore interazione diamante legante.
Nonostante, però, raggiungano valori di densità simili a quelli delle polveri a grana grossa sinterizzate con l'hot-pressing e abbiano un più alto contenuto di ossigeno, l'interazione è meno forte.
Lo stato di tensione intorno alle particelle di diamante durante la lavorazione influisce sull'interazione con il legante, sulla stabilità e sulla ritenzione e influenzerà le prestazioni dell'utensile. I rivestimenti metallici sulle particelle di diamante fungono da barriera protettiva e, generalmente, aumentano la forza di tenuta.

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much shorter soaking time at high temperature, diamond-bond interaction also increases.
Powders that are more active (finer) are able to reach higher densities by free sintering and consequently are also responsible for a higher diamond bond interaction than for FS-coarse, but in spite of reaching similar density values to HP-coarse and in having a higher oxygen content, interaction is less aggressive. The stress state in the bond around diamond particles during processing affects diamond bond interaction, stability and retention and will influence the performance of the tool.
Coatings in metallized diamond particles act as protective barriers for the diamonds and generally increase holding force.

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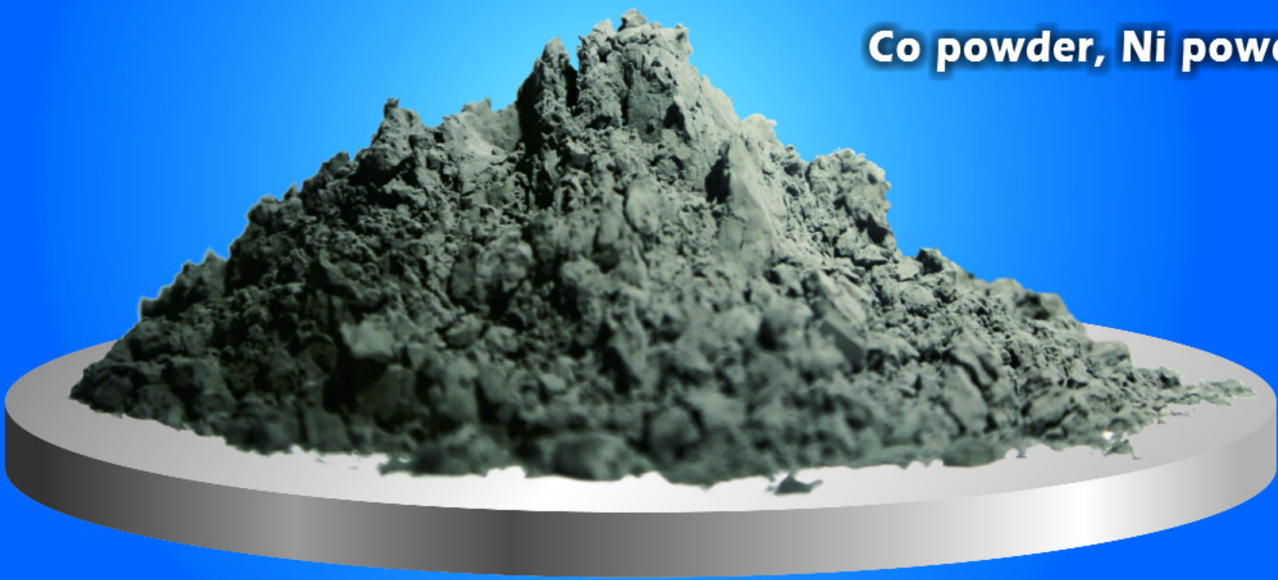

Sviluppo e caratterizzazione di sistemi a matrice metallica Fe/Cu, a gradiente di funzione, per migliorare la conduttività termica degli utensili diamantati

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ABSTRACT
I materiali compositi a matrice metallica impregnati di diamante sono utilizzati nella vasta area della lavorazione dei materiali minerali. Le principali applicazioni industriali riguardano il taglio e la finitura della pietra naturale e del calcestruzzo. I segmenti diamantati, fabbricati mediante metallurgia delle polveri e montati su dischi e foretti, sono composti da particelle di diamante sintetico a grana grossa, sinterizzate in una matrice metallica.
La composizione delle polveri per la matrice metallica prevede, generalmente, la presenza di ferro e cobalto con aggiunte di bronzo o rame. Questi elementi leganti nella matrice hanno dimostrato di essere adatti per la produzione di utensili diamantati anche in termini di durezza.
Questo studio, basato su componenti già utilizzati per le matrici metalliche, si concentra sullo sviluppo e sulla caratterizzazione di sistemi a matrice metallica a gradiente di funzione per migliorare la conduttività termica dei segmenti diamantati. Un elevato contenuto di rame nell'area centrale della matrice garantisce una migliore dispersione del calore nell'area di lavorazione riducendo, quindi, la quantità di acqua necessaria per il raffreddamento durante le applicazioni di taglio.

1. INTRODUZIONE
Nella vasta area dell'industria delle costruzioni, oltre che nell'estrazione delle pietre naturali e nelle successive applicazioni di finitura, i segmenti diamantati si sono saldamente affermati come i migliori utensili da taglio.
Data l'elevata abrasività dei materiali minerali, quali la pietra naturale (granito, basalto), il cemento e il calcestruzzo, includere delle particelle di diamante in una matrice metallica è il modo più efficace e produttivo per procedere nella loro lavorazione [1, 2].

Development and characterization of Fe/Cu-based, functionally graded metal-matrix systems for the use as thermal conductive diamond tools

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ABSTRACT
Diamond impregnated metal-matrix composites are used in the broad area of machining of mineral materials.
The main industrial applications cover the field of cutting and grinding natural stone and concrete. Powder metallurgically fabricated diamond grinding segments, which are attached to saws and drill bits, are made of synthetic coarse diamond particles, sintered in a metal-matrix. The compositions of the metal-matrix powders usually contain iron and cobalt with additions of bronze or copper. Regarding the hardness, such binder compositions have proven to be suitable matrix elements for diamond tools. Based on existing metal-matrix components, this paper focuses on the development and characterization of functionally graded metal-matrix-systems to enhance the thermal conductivity of the diamond segment. A high copper content in the central area of the matrix ensures an increasing thermal transfer out of the grinding zone that leads to a reduction of the cooling water in grinding applications.

1. INTRODUCTION
Within the large area of the construction industry, as well as natural stone extraction and further post-processing applications, diamond impregnated grinding segments are

Influenza della miscela di polveri sulla densificazione e sulla meccanica della pressatura uniassiale a freddo

di Ilaria Cristofolini[1], Gianluca Pederzini[2], Alex Rambelli[2], Alberto Molinari[1]
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ABSTRACT

In un lavoro precedente sono state determinate le relazioni che descrivono la densificazione di una miscela di polveri durante la pressatura uniassiale a freddo e il campo di sforzi per definire il modello costitutivo della polvere.
È stato definito un metodo di elaborazione più accurato, totalmente basato su dati sperimentali.
Il presente lavoro sfrutta questo nuovo metodo sperimentale per evidenziare l'influenza del materiale nel processo, analizzando il comportamento di due miscele di polveri commerciali a base ferro, che si differenziano tra loro per composizione chimica, metodo di alligazione e densità apparente. La densificazione è descritta mediante una nuova equazione, basata sulla densità in situ e sulla sua correlazione con la deformazione sperimentata dalla miscela di polveri all'interno della cavità della matrice. I parametri, nell'equazione della legge di potenza, consentono di identificare e confrontare l'influenza della miscela di polveri. È stato indagato il campo di sforzi che agisce sulla miscela di polvere e, per entrambi i materiali, sono state determinate le relazioni e confrontati i parametri che caratterizzano il modello costitutivo.

Parole chiave: pressatura a freddo, pressa idraulica, densificazione, meccanica della pressatura.

1. INTRODUZIONE

La pressatura a freddo mira ad ottenere la massima densità al verde, tenendo conto della complessità della geometria e di quanto richiesto dalla funzione del pezzo [1].
La comprimibilità della polvere determina la densificazione durante la pressatura a freddo che, a sua volta, è influen-

The influence of powder mix on densification and compaction mechanics in uniaxial cold compaction

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ABSTRACT

In previous work the relationships were determined which describe the densification of the powder column during uniaxial cold compaction and the stress field for the constitutive model.
An improved processing method totally based on experimental data was defined.
The present work exploits this improved experimental method to highlight the influence of material, investigating the behaviour of two commercial iron based powder mixes, which differ in chemical composition, alloying method, and apparent density. Densification is described by means of a new densification equation, based on the in-situ density and its correlation to the deformation experienced by the powder mix within the die cavity. The parameters in the power law equation allow to identify and compare the influence of the powder mix.
The stress field acting on the powder column is investigated, and the relationships and parameters describing the constitutive model of the powder column are determined and compared for both materials.

Keywords: cold compaction, hydraulic press, densification, compaction mechanics.

4. CONCLUSIONI

Questo lavoro ha studiato l'influenza della miscela di polveri sulla densificazione di pezzi pressati a freddo con pressatura uniassiale caratterizzata da un diverso rapporto H/D. Sono state considerate due diverse polveri commerciali atomizzate ad acqua, una parzialmente legata per diffusione (CuMoNi) e una prelegata (CrMo). L'approccio è stato sperimentale, basato sui dati registrati da una pressa in termini di forze e spostamenti.

In sintesi, si possono trarre le seguenti conclusioni:

❑ L'influenza del rapporto H/D è evidente quando la densità relativa viene ottenuta in funzione della forza di pressatura, mentre non si osserva nessuna influenza del rapporto H/D quando si misura la densità relativa in funzione dello sforzo assiale medio.

❑ CrMo ha una densità iniziale più bassa, il che implica che è richiesta un maggiore sforzo assiale medio per ottenere la stessa densità relativa, principalmente all'inizio della pressatura.

❑ La densificazione è descritta in termini di deformazione della colonna di polvere e sono stati identificati tre stadi principali, relativi ai meccanismi di deformazione/densificazione nella pressatura (deformazione per riarrangiamento, riarrangiamento + deformazione plastica e deformazione plastica). In ciascuna fase, per le due miscele di polveri, sono state ricavate le leggi di potenza e i relativi coefficienti sono stati confrontati. Abbastanza inaspettatamente, durante l'intero ciclo di pressatura CrMo subisce una deformazione maggiore rispetto a CuMoNi, con lo stesso sforzo assiale medio.

❑ Se la deformazione è correlata a quella massima teorica (derivata dalla densità teorica della miscela di polveri) CrMo subisce una deformazione inferiore rispetto a quella di CuMoNi per lo stesso sforzo assiale medio, confermando così una comprimibilità inferiore, prevista per la miscela di polvere prelegata.

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Fig.5 shows the deformation, referred to the maximum theoretical one, as a function of mean axial stress, for both powder mixes. The trend shown in Fig.5 shows that a slightly lower relative deformation is shown for CrMo, confirming the lower compressibility expected for the pre-alloyed powder mix.

4. CONCLUSIONS

This work investigated the influence of powder mix on the densification of uni-axially cold compacted parts characterised by different H/D ratio. Two different commercial water atomised powders, one diffusion bonded (CuMoNi) and one pre-alloyed (CrMo), were considered. The approach is experimental, based on the data recorded by the press in terms of forces and displacements.

In summary the main conclusions can be drawn:

❑ The influence of the H/D ratio is obvious when the relative density is plotted as a function of the compaction stress, while no influence of the H/D ratio is observed when plotting the relative density as a function of the mean axial stress.

❑ CrMo has a lower starting density, which implies that a higher mean axial stress is required to obtain the same mean relative density, mainly of the beginning of compaction.

❑ Densification is described in terms of deformation of the powder column, and three main stages have been identified related to the deformation/densification mechanisms in compaction (deformation due to rearrangement, to rearrangement + plastic deformation, and to plastic deformation). Power law relationships have been derived for the two powder mixes in each stage, and the relevant coefficients have been compared. Quite unexpectedly, during the whole compaction cycle CrMo experiences a higher deformation than CuMoNi at the same mean axial stress.

❑ If the deformation is related to the maximum theoretical one (derived from the theoretical density of the powder mix) CrMo experiences a lower deformation than CuMoNi at the same mean axial stress, thus confirming the lower compressibility expected for the pre-alloyed powder mix.

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SETTORE MERCEOLOGICO DI APPARTENENZA
Operativity Market Branch

- Diamante sintetico / *Synthetic diamond* (1)
- Diamante sintetico rivestito / *Coated synthetic diamond* (2)
- Nitruro di Boro cubico (cBN) / *Cubic Boron Nitride (cBN)* (3)
- Nitruro di Boro cubico (cBN) rivestito / *Coated cubic Boron Nitride (cBN)* (4)
- Diamante industriale in pietre / *Industrial diamond stones* (5)
- Diamante naturale in polvere / *Natural diamond powder* (6)
- Micropolveri di diamante sintetico, di cBN e di diamante naturale / *Micron powders of synthetic diamond, cBN and natural diamond* (7)
- Diamante Policristallino (PCD) / *Polycrystalline Diamond (PCD)* (8)
- Nitruro cubico di Boro Policristallino (PcBN) / *Polycrystalline cubic Boron Nitride (PcBN)* (9)
- Diamante CVD / *CVD Diamond* (10)

SETTORI APPLICATIVI
Application Sectors

(1) Estrazione e lavorazione della pietra, lavorazione della ceramica e agglomerati, lavorazione del vetro, lavorazione di metalli non ferrosi, lavorazione di materiali compositi / *Quarrying and processing of natural stone, ceramic and engineered stone processing, glass processing, non-ferrous metals processing, composite materials processing.*

(2) Impiego in lavorazioni gravose che richiedono lunga durata, impiego in leganti resinoidi / *Required in demanding and long-lasting processing, used in resin bond.*

(3) Lavorazione di metalli ferrosi / *Ferrous metals processing.*

(4) Impiego in lavorazioni gravose che richiedono lunga durata, impiego in leganti resinoidi / *Required in demanding and long-lasting processing, used in resin bond.*

(5) Perforazione e carotaggio di roccia, sagomatura e ravvivatura di mole abrasive, tastatori per misure in processo, tornitura e fresatura di metalli non ferrosi / *Rock drilling and coring, abrasive wheels shaping and dressing, in process probes, turning and milling of non-ferrous metals.*

(6) Lavorazione di pietra, lavorazione di materiali compositi, molette per dentale / *Stone processing, composite materials processing, dental burs.*

(7) Lappatura e lucidatura di tutti i materiali, riporti anti-usura / *Lapping and polishing of all materials, wear protective coatings.*

(8) Tornitura e fresatura di metalli non ferrosi e materiali compositi, lavorazione del Legno, trafilatura di fili metallici, perforazione di roccia, sagomatura e ravvitaura di mole abrasive / *Turning and milling of non-ferrous metals and composite materials, wood processing, metal wire drawing, abrasive wheels shaping and dressing.*

(9) Tornitura e fresatura di metalli ferrosi / *Ferrous metals turning and milling.*

(10) Sagomatura e ravvivatura di mole abrasive, applicazioni ottiche, tornitura e fresatura di metalli non ferrosi, riporti antiusura / *Abrasive wheels shaping and dressing, optical applications, turning and milling of non-ferrous metals.*

NUOVI PRODOTTI
New Products

◆ PCD e CVD per riporti antiusura / *PCD and CVD for wear protective coatings.*

SERVIZI
Services

● Analisi e qualifica di diamanti sintetici e naturali tramite il nostro POLILAB, dotato di strumenti per l'analisi fisica e ottica.

Tecniche per il taglio di compatti PCD e PcBN

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ABSTRACT
Allo scopo di ottimizzare l'utilizzo dei materiali, risparmiando sui costi, e di migliorare l'efficienza e la precisione del taglio gestendo le tolleranze nella fresatura, questo studio esamina i vantaggi e gli svantaggi legati all'impiego dell'elettroerosione a filo (WEDM, Wire Electro Discharge Machine) e del taglio laser nella produzione di compatti in PCD e PcBN.
Vengono proposte alcune nuove tecniche pratiche che, generalmente, indicano il taglio laser come la scelta migliore, anche se l'elettroerosione a filo (WEDM) dovrebbe essere considerata quando si devono tagliare dei compatti in PCD e PcBN costituiti da una fase dura più bassa e una granulometria più fine.

1. INTRODUZIONE

Gli inserti in diamante policristallino (PCD) e in nitruro di boro cubico policristallino (PcBN) sono largamente utilizzati nella lavorazione dei metalli non ferrosi, nell'industria mineraria e nella trivellazione di petrolio/gas, grazie alle loro eccezionali proprietà meccaniche, fisiche e chimiche, oltre all'alta resistenza ad usura.
I compatti in PCD e PcBN sono, però, difficili da tagliare, a causa delle loro microstrutture, delle proprietà fisiche e chimiche e della struttura multistrato. Questa, spesso, include un substrato di carburo cementato (WC/Co) che supporta lo strato superabrasivo di PCD o PcBN.
I diversi coefficienti di espansione termica causano un aumento delle tensioni interne, mentre le differenti composizioni portano a delle modifiche nella microstruttura e all'arricchimento di Co all'interfaccia.
I diversi valori di conducibilità elettrica e termica tra gli strati, oltre a variare con la composizione, sono un ulteriore elemento di complicazione.
L'elettroerosione a filo e il taglio laser sono i metodi più utilizzati per il taglio di precisione di questi materiali.
Tuttavia, in letteratura si trovano meno pubblicazioni sul processo WEDM e sul taglio laser di compatti in PCD e PcBN, rispetto a quelle che si occupano del taglio dei materiali metallici [1-3].
Questa memoria caratterizza l'area di taglio ottenuta con il processo WEDM e con il taglio laser, riassume i requisiti di

Cutting techniques of PCD and PcBN compacts

by Tai-quan Zhang [1], Hong-bo Nie [2]
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ABSTRACT
Aiming at improving cutting efficiency, material utilization to save cost, and cutting precision to manage the grinding allowance, this paper investigates the advantages and disadvantages of WEDM and laser cutting for cutting PCD and PcBN compacts. Some novel practical techniques are proposed, which indicate that laser cutting is generally the better choice but WEDM should be considered when cutting PCD and PcBN compacts with lower hard phase content and finer grain sizes.

1. INTRODUCTION

Polycrystalline diamond (PCD) and polycrystalline cubic nitride boron (PcBN) compacts are widely used in non-ferrous metal machining, mining, and oil/gas drilling, because of their exceptional mechanical, physical and chemical properties plus high wear resistance. PCD and PcBN compacts are difficult to cut apart due to their microstructures, physical and chemical properties, as well as their layered structure. This often comprises a substrate of cemented carbide (WC/Co) supporting the PCD or PcBN superhard layer.
The different thermal expansion coefficients lead to high internal stresses, while the different compositions lead to microstructural changes and Co-enrichment at the interface. The different electrical and thermal conductivity values between the layers, as well as varying by composition, are an additional complicating factor. Wire cut electrical discharge machining (WEDM) and laser cutting are the main precision

nell'area di taglio aumenta, il che si traduce in un'area di taglio più ampia. Per velocità del filo più elevate, gli sfridi vengono asportati in modo più efficiente dal fluido EDM, ma la breve permanenza e il minor tempo di scarica nell'area di taglio ne riducono la precisione.

5. CONCLUSIONI

La rugosità della superficie di taglio con il processo WEDM è significativamente migliore rispetto a quella ottenuta con il taglio laser, sebbene l'ampiezza totale dell'area di taglio (incluso lo strato superficiale danneggiato) sia doppia rispetto a quella del taglio laser. L'efficienza del laser è molto superiore a quella del WEDM, poiché la velocità del primo può raggiungere circa 100 mm/min, mentre quella del secondo si ferma a circa 3 mm/min. Perciò, nel complesso, per la maggior parte dei compatti in commercio in PCD e in PcBN il taglio laser è il metodo più conveniente.
Tuttavia, il WEDM dovrebbe essere considerato come la migliore soluzione quando si devono tagliare dei compatti PCD e PcBN con granulometrie più fini (<1 μm) e con un contenuto di fase dura più basso (< 55 vol.%) a causa dei potenziali problemi di fratturazione.
Per il taglio laser di compatti PCD e PcBN sono suggerite basse potenze e alte velocità di taglio, scegliendo per la messa a fuoco del raggio laser una posizione al di sotto della superficie dei compatti, in base alla profondità di campo dello specchio.
L'ampiezza totale dell'area di taglio con il taglio laser (somma dell'ampiezza dello strato degradato dal calore, del solco di taglio e dello strato ossidato) può essere mantenuta in un intervallo tra 150-220 μm, ottimizzando i parametri.
Quando si usa il laser per campioni in PCD o PcBN con angoli acuti (< 50°), si raccomanda di adottare una strategia di taglio in modo da trasformare un angolo acuto in due angoli ottusi.

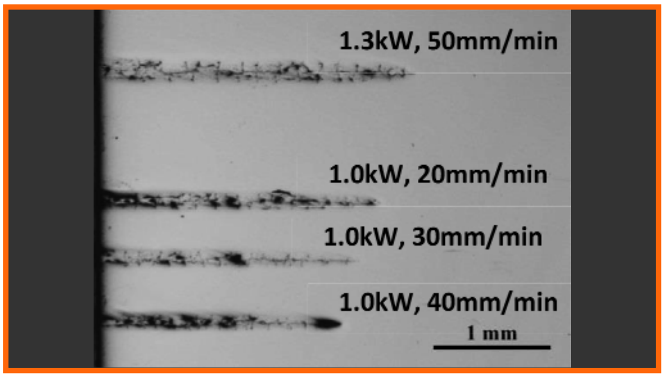

Fig.5 Effetto della potenza e della velocità di taglio con il laser Nd:YAG sul materiale di substrato WC-6Co / *Effect of Nd:YAG laser cutting power and speed on the cut in WC-6Co substrate material*

This article is based on a paper presented at Euro PM 2018 Congress & Exhibition held in Bilbao, Spain in October 2018 and is printed with kind permission of EPMA, European Powder Metallurgy Association and Authors.

5. SUMMARY

The roughness of the cut surface for WEDM is significantly better than for laser cutting, although the total width of the cutting region (including the damaged surface layer) for WEDM is twice as wide compared to laser cutting.
The efficiency of laser cutting is much higher than that of WEDM because the speed of the former can reach about 100 mm/min and the latter about 3 mm/min.
Therefore, overall, for most commercial PCD and PcBN compacts laser cutting is the most cost-effective method. However, WEDM should be first be considered when cutting PCD with finer grain sizes (<1 μm) and PcBN compacts with lower hard phase content (<55 vol.%) due to potential problems with cracking.
For laser cutting PCD and PcBN compacts, lower powers and higher cutting speeds are suggested, with the focus position of the laser beam set below the surface of compacts according to the focal depth of the focusing mirror.
The total width of the cutting region with laser cutting (sum of cutting gap, oxidized thin layer and heat affected layer) can be kept in the range of 150-220 μm by optimizing cutting parameters. When using lasers to cut PCD or PcBN samples with sharp angles (< 50º), a cutting strategy to change one acute angle into two obtuse angles is recommended.

6. ACKNOWLEDGEMENTS

Financial support from Science and Technology Major Project Foundation of the Fujian Province (No.2012HZ0001-1) is greatly acknowledged.

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SETTORE MERCEOLOGICO DI APPARTENENZA
Operativity Market Branch

- Diamante naturale (pietre) / *Natural diamond (rough)*
- Diamante naturale (polvere) / *Natural diamond (powder)*
- Diamante sintetico / *Synthetic diamond*
- Diamante sintetico rivestito / *Coated synthetic diamond*
- Nitruro di Boro cubico (cBN) / *Cubic Boron Nitride (cBN)*
- Nitruro di Boro cubico Policristallino (PcBN) / *Polycrystalline cubic Boron Nitride (PcBN)*
- Diamante Policristallino (PCD) / *Polycrystalline Diamond (PCD)*
- Diamante CVD / *CVD Diamond*
- Diamante Monodie / *Monodie Diamond*

LINEA PRINCIPALI PRODOTTI
Main Product Lines

Diamanti industriali, sia pietre che polveri, per la costruzione di utensili diamantati / *Industrial diamonds, both rough and powders, for the manufacture of diamond tools:*

❒ Diamante naturale industriale / *Natural industrial diamond.*

❒ Polvere di diamante naturale, nelle grane grosse e fini / *Natural diamond powder, both in grit and wheel size.*

❒ Polvere di diamante sintetico, ricoperto e non, per uso con legante resinoide / *Synthetic diamond powder, both coated and uncoated, for use in resin bond tools.*

❒ Polvere di diamante sintetico per uso con legante metallico / *Synthetic diamond powder for use in metal bond tools.*

❒ Prodotti in Nitruro di Boro cubico ricoperto e non / *cBN products, both coated and uncoated.*

❒ Micropolveri di diamante naturale, sintetico e cBN / *Natural diamond, synthetic diamond anc cBN micropowders.*


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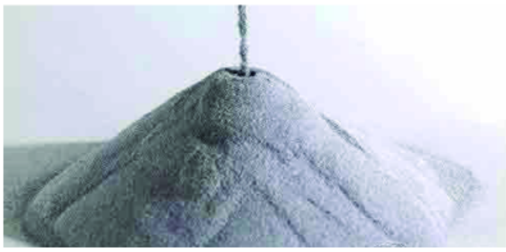
Powder Metallurgy Review
Additive Manufacturing Today
Powder Metallurgy, Cemented Carbide Related Associations, Institutes, Organizations

EXHIBITION ADVANTANGES AND HIGHLIGHTS

1. The organizing committee has extensive experience, the exhibition brand is trustworthy
2. A high-quality platform that gathering the whole industry chain
3. Rich concurrent events, gathering well-known persons and elites to offer tips, advice and indicate development direction for enterprises
4. All-Round publicity and promotion and purchaser organization
5. Providing featured professional services, ensuring the effectiveness of the exhibition



CONCURRENT EVENTS

- 2019 Asian Summit on Powder Metallurgy Industry Technology Development
- International Powder Metallurgy New Product and Technology Promotion Conference
- The 17th Shenzhen (China) International Small Motor, Electric Machinery & Magnetic Materials Exhibition
- 2019 Shenzhen (China) International Power Industry, Electronic Transformer & Winding Exhibition
- 2019 Shenzhen (China) International New Energy Vehicle Electric Control Exhibition
- 2019 Shenzhen Intelligent Manufacturing • Sheet Metal Processing • Industrial Laser Expo
- 2019 Shenzhen (China) International Bearing and Dedicated Devices Exhibition

EXHIBIT SCOPE

Powder metallurgy raw materials

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XIAMEN INTERNATIONAL STONE FAIR 2019

Get a glimpse of the global latest stone products

Xiamen International Stone Fair, the largest and most significant stone and machinery industry show in the world, is committed to serve as a valuable platform for networking with global company representatives. Building on its strength, the 19th Xiamen Stone Fair (March, 6-9) will keep adding new aspects that will made the show, once more, an incredible experience for today's industry professionals.

ENTHUSIASTIC CROWDS AND VARIETY OF PRODUCTS

The 2018 edition of the Xiamen International Stone Fair covered 180,000 m^2 of exhibition space and showed the latest products from more than 2,000 exhibitors representing over 56 countries. Countries such as Italy, Turkey, Brazil, Egypt, Spain, Portugal, France, Greece, India, Iran and Pakistan organized their national pavilions.

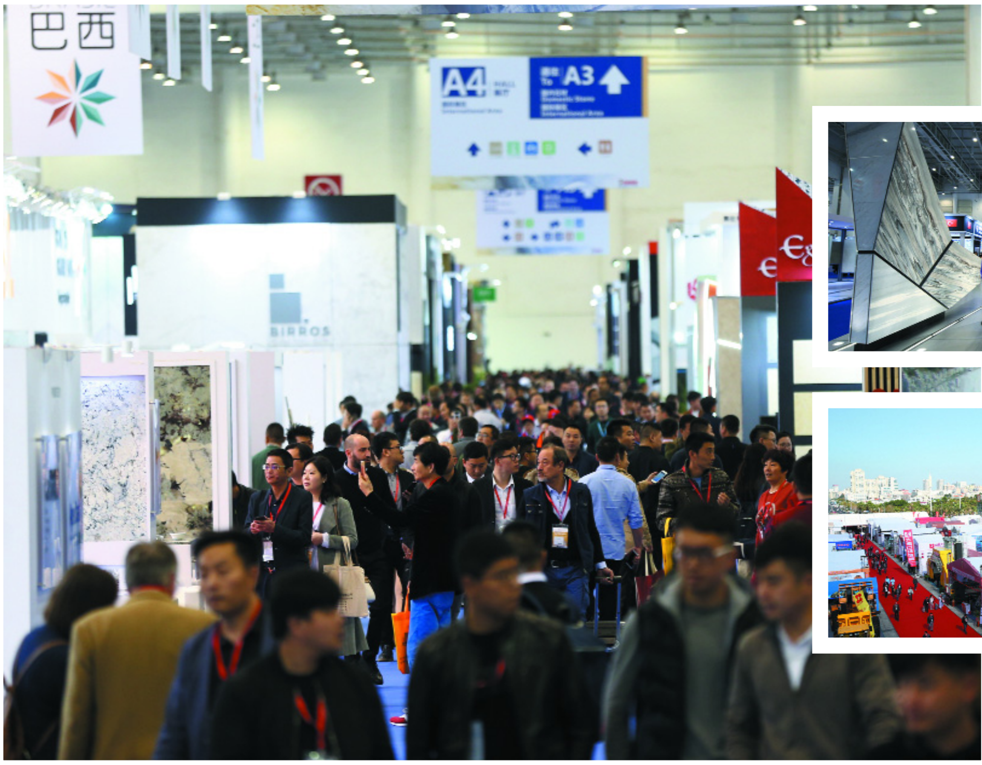
WHY CHOOSE XIAMEN STONE FAIR?

Learned from the General Administration of Customs, China's total amount of stone imports and exports amounted to USD 9.61 billion, with 49.08 million tons involved in 2017. The imports capped a robust year and reached to 14.65 million tons valuing USD 2.79 billion with an increase in tonnage of 23.21% and by value of 26.78%.

As the most active stone production and consumption market, China's total trade share in the global stone industry maintains at about 25%~30%.

WHAT'S NEW IN 2019?

"Launch Out @XSF" is the project that aims to help visitors to source targeted products among numerous exhibits on Xiamen Stone Fair. Hall C3b has become the exhibition hall specified for new products. Exhibitors in this area not only display their product on their own booths, but also present their products on releasing conference. It's such an efficient way to promote new products, this year the exhibition space of Hall C3b has increased by more than 20%. This year, "Stone Infinite" will be moved to the exclusive exhibition hall - Hall B2, which was chosen by the BRICS Summit 2017. "Stone Design Forums" will be held just next to it. In these two exhibition spaces, visitors will see the masterpiece of stone designers, refresh their ideas on design



forums and learn from the new projects.

Moreover, the Natural Stone Institute will present the winning projects of the 2018 Pinnacle Awards for the first time in China, which are given to projects whose beauty, creativity, ingenuity, and craftsmanship exemplify professional mastery in the use of natural stone in commercial and residential applications.

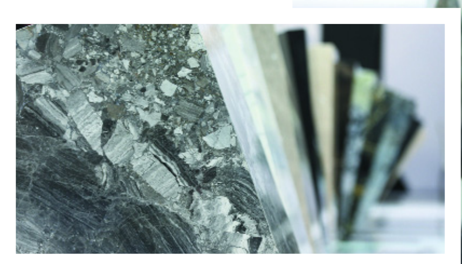
The World Stone Congress (WSC) is a series of most anticipated events for people attending Xiamen Stone Fair, composed of four main sessions: "Global Master Architects Forum", "Stone Design Forum", "Stone Educational Sessions" and "Sessions for Industrial Promotion".

In cooperation with the authoritative stone associations, more than 50 education seminars will be held in 2019.

The most-up-to-date industry knowledge will be presented by the world's top master architects, designers, and stone experts. You can mingle with industry peers, and gain the knowledge that will help advance your business at Xiamen Stone Fair Education Seminars.

Xiamen Stone Fair once again confirmed its statue as the global hub and world-leading B2B platform of stone and machinery trade.

Please plan your visit to Xiamen Stone Fair 2019, click for more details: www.stonefair.org.cn.



The address of natural stone 25th Marble Fair

Turkish natural stone, which constitutes 40 percent of the world natural stone reserve, is used all over the world in 650 different colors and textures. Marble Izmir Fair, which is a world-renowned natural stone exhibition, will open its doors in its 25th year with activities that will bring the stone usage areas to the fore. The Fair will support the efforts made to design Turkish stone and to choose it around the world.

One of the most important cities in Turkey's natural stone Export Fair held in Izmir, with the display of natural stones from Turkey and different countries, it becomes a more splendid platform every year. The fair hosted by Izfas and organized by Izmir Metropolitan Municipality, will play an important role in bringing Turkey to the top of natural stone exports in the near future.
In 2017, Turkey, which exports USD 2.1 billion with 180 countries, contracted USD 946 million 550 thousand with 167 countries in the first half of 2018, one of the most important factors in capturing these figures was the purchase committees from 62 countries at Marble Izmir fair.
As a result of tens of thousands of business meetings of industry representatives from all over the world with participants during the fair, agreements were signed for Turkish natural stone exports.

NOW IT'S TIME FOR THE TURKISH STONE

Turkish natural stone, as well as the power of thousands of years of journey in Anatolia, as well as the world stage will now be in the field of design.Turkish stone, which is used in the most extraordinary building designs of the world with its quality and diversity, will say, "I am in every sector encountered in everyday life."
The representatives of the sector have taken action to open the way for increasing the added value of Turkish natural stone and taking part in more projects.
The first International step was the launch of the "I am Turkish stone" campaign launched by Istanbul mining Exporters' Association at MIPIM Real Estate Fair, which brings together the real estate sector and architecture companies in Cannes, France every year.
Considering the quality and diversity of the Turkish natural

stone, Aydın Dinçer, the Chairman of the Board of Directors, started the campaign with the words “We want to introduce Turkish marble to the whole world by branding. We can integrate our natural stone with the design world.”

TURKISH STONE CHANGES SHAPE

Marble Izmir Fair, which introduces itself with the slogan “experience in natural stone source” all over the world, will mark the sector with the International Stone Congress while completing its quarter century. Within the scope of the congress, presentations will be made on the use of natural stone from the ancient period to the present and the future, the importance of stone in contemporary architectural design, the cultural dimension of stone, the design of innovative methods in stone production and the use of stone in mosaic design.
In addition, workshops and various activities will be carried out on the use of stone and its design process. In addition, the Natural Stone Institute will open a booth with a team of 40 people during the exhibition and train the local firms for the use of natural stone usage standards.
The World Stone Forum, consisting of representatives of the natural stone industry from all over the world, will be held this year. The design future of the sector for the Young Creative Idea Platform, applications have started. The platform brings together students and new graduates of the design and Architecture Department of universities in various cities of Turkey with leading companies in the sector and the sector will strengthen with new designs and will encourage original designers to create innovations in international markets.

27-30 MARCH, MARBLE IZMIR TIME

Marble Izmir Fair, between 27-30 March, will open its doors for a quarter century. The fair, which is the largest natural stone fair in the world, will enter the quarter-century with the targets and works for the use of the Turkish natural stone by increasing the added value.

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FIERA MILANO

Tyrolution, nuovi standard per i dischi ultrasottili

Dalla fine dello scorso anno è disponibile la nuova gamma degli utensili di nuova generazione della società austriaca, completamente rinnovati nella formulazione, nei diametri e in grado di garantire performance eccellenti

di Giacomo Galli, Ufficio Stampa Tyrolit

Tyrolit, azienda leader mondiale nella produzione di dischi abrasivi e diamantati per il taglio, annuncia l'inizio di una nuova era per i suoi prodotti per il taglio di acciaio inossidabile e metalli non ferrosi come alluminio, rame e ottone, oltre alla pietra.
È di pochi mesi fa la presentazione della nuova gamma dei dischi da taglio extra sottili, completamente rinnovati nel diametro e nelle specifiche, ma soprattutto in grado di garantire prestazioni eccezionali.
Si tratta di prodotti di nuova concezione che vanno a interessare tutte le tre linee della produzione dell'azienda austriaca – Premium, Standard e Basic – un rinnovamento quindi strutturale per definire nuovi standard di efficienza, a tutto vantaggio degli utilizzatori.
Un rinnovamento che l'azienda ha voluto chiamare "Tyrolution", ovvero Tyrolit Revolution.
Le caratteristiche della nuova gamma dei dischi ultrasottili da taglio riguardano aspetti fondamentali e fortemente caratterizzanti dei prodotti. In primo luogo, le prestazioni delle soluzioni attualmente disponibili sul mercato sono state migliorate anche fino al 60%.
Le vibrazioni sono state ridotte, migliorando notevolmente sia il comfort che la sicurezza per l'operatore durante l'utilizzo del disco. Lo speciale isolamento acustico assicura inoltre uno smorzamento notevole del rumore durante la lavorazione, mentre una riduzione fino al 30% nella produzione di polvere è certamente un'altra importante conquista, a tutto vantaggio del confort durante le lavorazioni.
Per ottenere questi risultati, la Divisione Ricerca e Sviluppo di Tyrolit ha sensibilmente migliorato la purezza chimica dei dischi da taglio per acciaio inossidabile.
La nuova gamma offre infatti la massima efficacia nella lavorazione di questo tipo di materiale. Si evitano effetti negativi sul pezzo (come corrosione o vaiolatura) e una finitura superficiale migliorata elimina di dover ricorrere a lunghe operazioni di ritocco per rimuovere gli scarti e la formazione di bava.
Il risultato è una forte riduzione dei tempi di lavorazione con conseguente risparmio di costi.
L'attenzione ai costi di lavorazione è infatti un imperativo per Tyrolit. Per il taglio di metalli non ferrosi l'azienda

Tyrolution, new standards for ultra-thin discs

The new range of next generation tools from the Austrian company is fully renewed in formulation and diameters to provide excellent performance

by Giacomo Galli, Tyrolit Press Office

Tyrolit, a world leading manufacturer of abrasive and diamond cutting discs announces the start of a new era for its products for stainless steel and non-ferrous metals cutting such as aluminum, copper and brass, in addition to stone.

The launch of the new range of extra fine cutting discs, completely renewed in diameter and specifications and above all able to deliver exceptional performance, took place in october 2018. These are new concept products that impact all three production lines of the Austrian company - Premium, Standard and Basic -, a structural renewal to set new efficiency standards for all users.

A renewal named "TyRolution" or Tyrolit Revolution by the company.

The characteristics of the new range of ultra-thin cutting discs involve a series of key features of the products.

First of all, the performances of the solutions currently available on the market have been improved up to 60%. Vibrations have been reduced, greatly improving both comfort and safety for the operator during the use of the disc. The special acoustic insulation also ensures considerable noise reduction, while a reduction of up to 30% in dust production is certainly another important achievement, providing better comfort of use. To achieve these results, the Tyrolit Research and Development Division has significantly improved the chemical purity of stainless steel ha sviluppato uno speciale metodo di produzione che permette di aumentare la velocità di taglio, grazie alle nuove specifiche che impediscono l'ostruzione e la smussatura del disco da taglio, spesso causate dall'abrasione dei materiali.

LA NUOVA GAMMA TYROLUTION

Tyrolution ha coinvolto sia i prodotti della Serie Premium (il top di gamma), sia la Serie Standard che la Serie Basic. Ciò significa che sia in caso di applicazioni estreme, utilizzo quotidiano o lavorazioni di base, i dischi Tyrolit garantiscono sempre eccellenti performance.
I dischi extrasottili PREMIUM*** per acciaio inossidabile (disponibili negli spessori da 0,75 a 2,0 millimetri) garantiscono un taglio perfetto, che non prevede quindi ulteriori ritocchi, e con un'usura di utensile nettamente ridotta. Questo prodotto è particolarmente indicato per il taglio di lamiere, profili e tubi a pareti sottili, ma viene consigliato anche per il taglio del ferro di armatura, piccole sezioni e barre in acciaio inossidabile.
L'utensile lavora senza produrre contraccolpi e deviazioni, con il 30% in meno di formazione di polvere.
Con uno spessore da 1,0 a 1,6 millimetri, i dischi da taglio extrasottili PREMIUM LONGLIFE per tutti i tipi di acciaio si distinguono per la loro durabilità, indice di eccellente produttività. Anche in questo caso, l'innovativa tecnologia Tyrolit garantisce la migliore precisione di taglio e la perfetta finitura della superficie, evitando qualsiasi intervento di ritocco.
Le medesime performance sono garantite anche dai dischi da taglio per i materiali non ferrosi come piastrelle, ceramica e clinker.
La nuova gamma dei dischi da taglio STANDARD, disponibile con spessori viabili da 1,0 a 1,9 millimetri, e particolarmente indicati per il taglio dell'acciaio inossidabile, sono a loro volta caratterizzati da una formulazione ideale per il taglio di questo materiale, in quanto è necessario evitare effetti negativi come la formazione di corrosione, anche perforante, oltre alla riduzione della resistenza. Come tutti i prodotti Tyrolit, garantiscono precisione e velocità di taglio, ma soprattutto la massima sicurezza d'impiego, oltre a una durata ben superiore alla media.
La rivoluzione tecnica Tyrolit ha reso la gamma BASIC per la lavorazione di lamiere, profili, tubi e barre filettate un condensato di tecnologia.
I diametri disponibili variano da 1,0 a 1,6 millimetri, le caratteristiche di efficienza, perfezione e pulizia del taglio sono assicurati anche per le lavorazioni dove di solito sono richieste solo velocità e praticità.
Qualcosa in più di un semplice prodotto di "base", perché alla base c'è Tyrolit.

cutting discs. In fact, the new range provides maximum efficiency in processing this type of material.
No negative effects on the workpiece (such as corrosion or pitting) and an improved surface finish eliminates the need for long retouching to remove waste and burr.
The result is a significant reduction in processing times with consequent cost savings.
The focus on processing costs is indeed an imperative for Tyrolit. The company has developed for cutting non-ferrous metals a special manufacturing method that allows to increase the cutting speed, thanks to new specifications that prevent disc clogging and bevel, often caused by abrasion.

THE NEW TYROLUTION RANGE

Tyrolution has involved both the Premium Series products (the top of the range), the Standard Series and the Basic Series. This means that Tyrolit discs always deliver excellent performance both in extreme applications, daily use or basic operation. PREMIUM*** extra-thin discs for stainless steel (available in thicknesses from 0.75 to 2.0 mm) guarantee a perfect cut, which does not require further retouching, and a considerably reduced tool wear.
This product is particularly suitable for cutting thin metal sheets, profiles and pipes, but it is also recommended for cutting reinforcement bars, small sections and stainless steel bars. The tool works without producing backlashes and deviations with 30% less dust.
Featuring thickness from 1.0 to 1.6 mm, PREMIUM LONGLIFE ultra-thin cutting discs for all types of steel provide durability and excellent productivity. Also in this case, the innovative Tyrolit technology guarantees the best cutting precision and perfect surface finish, avoiding any retouching. The same performance is also guaranteed by cutting discs for non-ferrous materials such as tiles, ceramics and clinker.
The new STANDARD range of cutting discs, available in thicknesses ranging from 1.0 to 1.9 mm and particularly suitable for cutting stainless steel, feature an optimal formulation for cutting this material as it is necessary to avoid negative effects such as corrosion, even perforating, in addition to resistance reduction. Like all Tyrolit products these discs guarantee precision and cutting speed, but above all maximum safety of use and a well-above-average life.
Tyrolit technical revolution has made the BASIC range for cutting metal sheets, profiles, tubes and threaded rods a concentrate of technology. Available diameters range from 1.0 to 1.6 mm, efficiency, cut perfection and cleanliness are also ensured in operations where only speed and convenience are usually required. Something more than just a "basic" product, because it's Tyrolit.